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Export structure and export specialisation in Central and Eastern European countries

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Export structure and export specialisation in Central and Eastern European countries*

(A kelet-közép-európai országok exportszerkezete és exportspecializációja)

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Abstract

Before the millennium Hungary's market share in exports of goods was increasing at the fastest rate in Central and Eastern Europe; however, after 2000 that growth became the lowest. The slowdown in growth in Hungary's export market share is mainly due to the stagnating price index of goods exports. The aim of this paper is to examine whether this process was caused by reaching an equilibrium or structural factors.

In the paper the exports of goods structure (by product, country, technology, skill and intensity), the relationship between export specialisation and export price indices, and the role of import demand in specialisation are examined for the Visegrad Group and Romania in the periods 1995–1999 and 2000–2007. The results imply that the stagnation of Hungarian goods export prices is partly natural and partly brought about by structural factors.

JEL: F10, F14.
Keywords: exports, export structure, specialisation.

Összefoglaló

Az ezredforduló előtt Kelet-Közép-Európában Magyarország (áru)exportpiaci részesedése emelkedett a leggyorsabban, ugyanakkor az ezredforduló után relatíve nálunk volt a leglassabb a növekedés. Az (áru)exportpiaci részesedésnövekedés mérséklődése elsősorban a magyar áruexport-árindex stagnálására vezethető vissza. A tanulmány célja annak megállapítása, hogy ez a folyamat mennyiben tekinthető egyensúlyinak, illetve milyen strukturális, szerkezeti okokra vezethető vissza.

A tanulmányban a visegrádi országok és Románia 1995–1999 és 2000–2007 közötti áruexport-szerkezetét (termék-, ország-, technológia-, képzettség-, tényezőintenzitás-szerkezetét), az egyes országok exportspecializációjának és árindexeinek kapcsolatát, valamint az ágazatok termékei iránti importkereslet specializációban betöltött szerepét tanulmányozom. Az eredmények fényében a magyar (áru)exportárak ezredforduló utáni stagnálása természetes folyamat lehet, ugyanakkor részben szerkezeti okokra is visszavezethető.

1 Introduction

Before the millennium Hungary's market share in exports of goods was increasing at the fastest rate in Central and Eastern Europe (CEE). However, Hungarian growth has been the slowest since 2000. The slowdown in growth of the country's market share can be traced back to the stagnation of goods export prices.

The exports of goods structure (by product, country, technology, skill and intensity), the relationship between export specialisation and export price indices, and the role of import demand in specialisation are examined for the Visegrad Group and Romania in the periods 1995–1999 and 2000–2007. Primarily Eurostat, UN, OECD, EU Klems and national statistical offices' databases and methodologies are used. More information about data and methodology can be found in the Appendix.

Several hypotheses are proposed as a possible explanation for the slowdown in growth of Hungary's export market share:

A) Hungary's foreign trade approached its potential by the millennium, consequently, the slowdown in export market share dynamics can be viewed as a natural process. This is confirmed by the fact that by the turn of the century the structure of Hungarian goods exports by product and technology had become very similar to that of Western countries. Moreover, the share of high-tech exports, which means a higher price level, remained stable in the 2000s, consequently, it could not affect the price index of Hungarian goods exports positively.

B) Since 2000 the high-tech export share has remained stable in relation to the EU, but it increased outside the EU. The share of Hungary in the EU high-tech market – primarily compared with that of the Czech Republic – increased less and it probably sold high-tech products outside the EU, albeit at a lower price. In connection with this, Hungary's exports restructured more to non-EU countries, where export products could likely be sold at a lower price.

C) Compared to the EU, Hungary is specialised in certain industries and has increased specialisation in some, the export prices of which behaved unfavourably compared to other countries in the region. EU import demand probably played a significant role in export specialisation.

The results imply that the stagnating Hungarian export prices partly reflect a natural process, but are partly brought about by structural reasons.

It is important to note that export price levels are not examined, only export price indices. However, relative prices have to be analysed, as export dynamics are needed to know, but not enough to understand processes, consequently, for the future analysing price levels represents an important research area.

The paper has the following structure. In Chapter 2 the main findings of the relevant literature are described. In Chapter 3 the unfavourable changes in Hungarian export performance after 2000 are shown and possible hypotheses are outlined. Chapter 4 contains a summary and identifies future research areas.

2 Literature summary

Central and Eastern European countries are usually small and open economies. Hence economic growth is – besides the domestic demand – mainly driven by export performance. Dynamic export growth and the increase in export market share play a key role in catching up with Western Europe and a higher integration into EU and world trade.

Since 1990 the export market share of countries in the region went up significantly in spite of real exchange rate appreciation (Fabrizio et al., 2006). According to the authors, this does not mean that the real exchange rate is irrelevant for export performance. Rather, it means that the dynamic export market share increase is a result of important structural changes (higher role of high technology in industry and exports, privatisation, end of trade barriers). However, the change in export market share is also significantly influenced by the initial export market share level. Lower initial export market share – as regards Central and Eastern European countries at the beginning of 1990s – ceteris paribus results in a higher growth rate.

In the literature several papers deal with the question of to how close CEE countries foreign trade reached the equilibrium level. Jakab et al. (2000) estimated a static – with equilibrium changing in time – gravitation equation for the Czech Republic, Poland and Hungary. According to the results, Hungary's integration was the fastest, as until 1997 Hungarian exports and imports became close to their potential levels. The Czech convergence was the second fastest regarding exports and only the third regarding imports. At the same time Poland's import integration exceeded its export integration. A model with FDI was also estimated which pointed out that Hungary is overintegrated, while the Czech Republic's and Poland' foreign trade achieved equilibrium by the millennium.

According to Bussiere et al. (2005), the integration between CEE countries and the euro area is so high that it exceeds that of some Baltic and South European countries, but there is still scope for further integration. Hungary's foreign trade is close to potential, but the Czech Republic, Poland and especially Slovakia are still some distance from equilibrium. Analysing the export structure by countries they raise the question of whether Hungary and the Czech Republic are not integrated more than equilibrium into the euro area, as their share of exports going to the euro area decreased slightly in recent years.

Integration, openness and intra-industry trade are very important regarding correspondence of business cycles (Report on Convergence, 2008). Hungary was already at the millennium very open and integrated, with a share of intra-industry trade similar to that of the euro area. Although the euro area is still the most important export partner, the role of foreign trade between new member states increased significantly. The share of high-level products in exports and value added is significant, which helped avoid negative cost competitiveness shocks in the past. According to Fabrizio et al. (2006) increasing high-tech export share causes higher unit value compared with other countries.

In parallel with deeper integration, the export structure also changed markedly in the region. Crespo–Fontoura (2007) examined the new member states' exports of goods going to the EU15 in time and by cross section. According to Lawrence indices,[1] the export structure of CEE countries changed significantly – mainly in Slovakia and Hungary – but the change was even greater in the Baltic countries. At the same time, the role of labour intensive technology is still important in the region (though the least in Hungary). The share of exports related to low-skill decreased sharply, but it is still high by international comparison (it is lowest in Hungary). The Czech and Hungarian export structure is the most similar to that of old EU member states, the Hungarian export structure resembling mainly the Austrian and German examples.

Crespo–Fontoura (2007) pointed out that joining the euro area may result in further convergence of export structure in the region. In accordance with this, Ottaviano et al. (2007) showed that a company is *ceteris paribus* more competitive as a euro area member state than outside the euro area. At the same time, joining the EU does not improve competitiveness, the effect is positive only if a relatively less productive East European firm's productivity and competitiveness improves.

[1] The Lawrence index shows the change in export structure, comparing the export structure at two different points in time. For more detail see Crespo–Fontoura (2007).

Landesmann–Wörz (2006) analysed the export specialisation of new CEE member states.[2] Regarding medium and high-tech products, specialisation increased, which the authors explained by unit labour costs. The European Central Bank (2005) analysed the export specialisation of the US, Japan and CEE between 1992 and 2003. The euro area is more specialised in medium-tech products, which had a stable demand. However the US and Japan are more specialised in high-tech products, the demand for which is volatile and in the period analysed was somewhat more unfavourable. In addition, the euro area's export specialisation is risky, as regarding medium-tech products CEE countries are serious competitors and in the future the demand for high-tech products may increase.

[2] Vollrath and CEPII indices were calculated. The Vollrath index compares a country's export in an industry to other counrties' export in other industries. CEPII is a revealed comparative advantage based on foreign trade balance, which shows the contribution of industries to the whole foreign trade balance. For more detail see the Appendix in Landesmann–Wörz (2006).

3 Question raising and possible hypotheses

QUESTION RAISING

In 1994 the export market share of CEE countries was usually lower and increased faster that that of Western countries (Table 1).[3] However, there are differences between CEE countries before and after 2000: in the second half of the 1990s the Hungarian export market share increased the fastest, but after the millennium the growth rate in Hungary was the lowest.

The Hungarian export market share growth slowed down, despite the fact that there was a real exchange rate appreciation in CEE countries after 2000 (Table 2). That is why probably it cannot be traced back to the real exchange rate, but to other structural reasons.[4] In parallel with the slower Hungarian export market share dynamics, only Hungary's foreign trade faced a similar exports of goods value and volume increase in the 2000s (Chart 1).[5]

Table 1

Export market share in Central and Eastern Europe

	Export market share in 1994 (%)	Yearly average change in export market share, 1995–1999	Yearly average change in export market share, 2000–2007
Czech Republic	0.3	7.6	9.9
Hungary	0.2	13.2	6.7
Poland	0.4	3.8	10.5
Romania	0.1	1.0	8.9
Slovakia	0.2	3.1	12.6
Slovenia	0.2	–2.1	6.6
Austria	1.1	2.1	1.6
Belgium	–	–	0.7
Germany	10.0	–0.8	1.3
Spain	1.7	1.9	–0.7
Portugal	0.4	0.6	–0.5
Ireland	0.8	9.7	–3.9
Finland	0.7	1.6	–1.2
Sweden	1.4	0.9	–1.3

Note: Source of data is AMECO. In the table exports of goods market share means share in world exports (including exports inside EU). Data for Belgium are available since 1999.

Table 2

Real exchange rate in Central and Eastern Europe

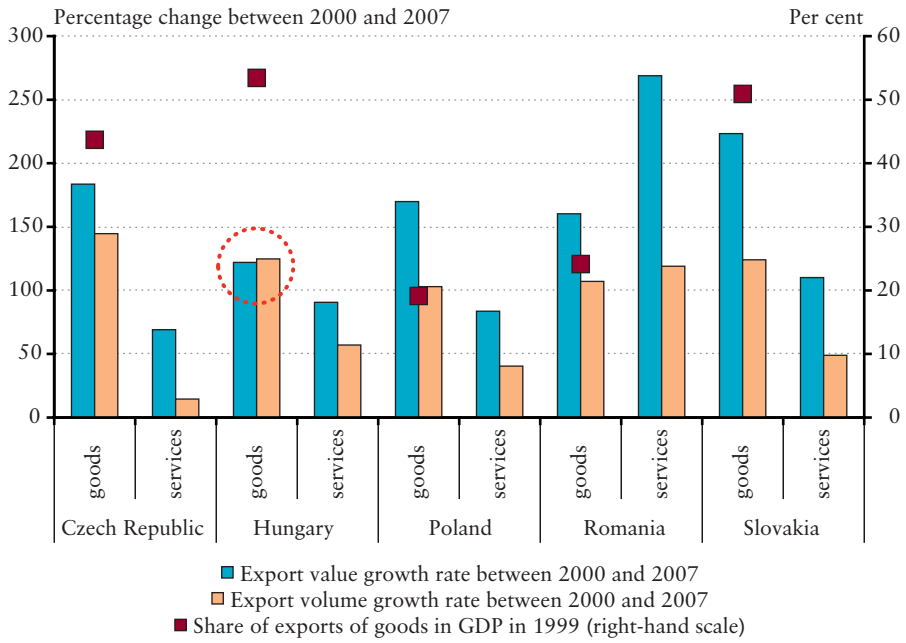
	Percentage change between 1995 and 1999	Percentage change between 2000 and 2007
Czech Republic	22.1	47.7
Hungary	–4.6	43.6
Poland	11.7	–2.3
Romania	21.6	62.3
Slovakia	4.0	40.2

Note: The table shows the real exchange rate based on unit labour cost. A positive value means appreciation. Data source is Eurostat.

[3] In countries with higher (lower) initial export market share, export market share growth ceteris paribus is lower (higher) (Fabrizio et al., 2006).
[4] Similar results are found in Farbrizio et al. (2006).
[5] It is important to note that the Hungarian services export dynamics in value and volume terms were similar to other countries in the region.

Chart 1

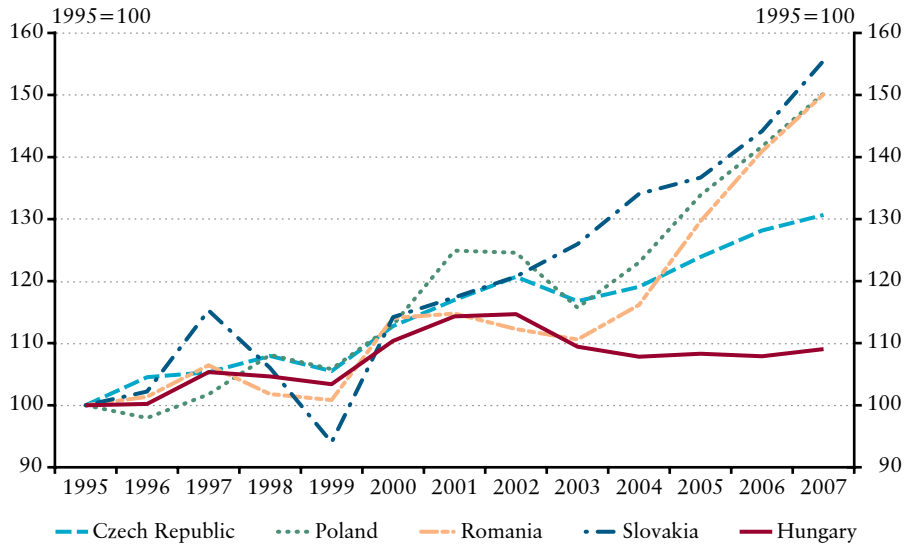
Exports of goods and exports of services dynamics in Central and Eastern Europe



Note: Data source is national accounts published by Eurostat. Exports of goods and exports of services in value, and the share of exports of goods in GDP are based on euro, while volume data relate to 2000 prices.

Chart 2

Implicit euro-based exports of goods price indices in the region



Note: Data source is AMECO.

The similar dynamics regarding exports of goods in value and volume indicate a stable price index of goods exports since 2003 (Chart 2).[6] Moreover, the stagnation after the millennium was not preceded in the second half of 1990s by a dynamic increase relative to other countries. The unfavourable exports of goods price index had a negative impact on the exports of

[6] It is important to note that transfer prices play an important role in foreign trade price indices. For more detail see Halpern–Koren (2004).

goods and services price index as well. The Hungarian export price index increased only very slightly after 1995, while in other Central and Eastern European countries the increase was remarkable.[7,8]

HYPOTHESES

The slowdown in exports of goods market share growth after 2000 in Hungary is a cause of the stagnating exports of goods price index (Chart 1). In this paper some hypotheses are outlined as possible explanations:

A) *Equilibrium hypothesis:* Hungary's foreign trade approached its potential by the millennium, consequently, the slowdown of export market share dynamics can be viewed as a natural process. This is confirmed by the fact that by this time the Hungarian exports of goods structure by product and technology had become very similar to that of Western countries. Moreover, the share of high-tech exports, which means a higher price level, remained stable in the 2000s, consequently, it could not affect the Hungarian exports of goods price index positively.

B) *Structure hypothesis:* Since 2000 the high-tech export share remained stable in relation to the EU, but it increased outside the EU. Hungary's share in the EU high-tech market – primarily compared with that of the Czech Republic – went up less and it probably sold high-tech products outside the EU, but at a lower price. In connection with this, Hungary's exports restructured more to non-EU countries, where export products could likely be sold at a lower price.

C) *Export specialisation:* Compared to the EU, Hungary is specialised in certain industries and has increased specialisation in some of them, the export prices of which behaved unfavourably compared to other countries in the region. EU import demand may have played a significant role in export specialisation.

In the following chapters the above hypotheses are analysed. Hypothesis A implies that the slowdown in export market share dynamics is a natural process, whereas hypotheses B and C imply that there are likely structural causes.

A) Equilibrium hypothesis

Central and Eastern European and West European countries mainly export machinery and transport equipment, and manufactured goods (Chart 3).[9] In the region the Czech and Hungarian export structure is the most similar to that of Germany,[10] although Hungary exports proportionately even more machinery and transport equipment than Germany. The export structure of Romania differs the most from other countries' structures.

At the same time, the changes in export structure differ from country to country. Regarding the Czech Republic and Hungary, the restructuring towards machinery and transport equipment occured mainly before the millennium. In Polish exports the share of machinery and transport equipment increased faster before the millennium than after it, but altogether the structure changed less than in the Czech Republic or Hungary. The restructuring began after 2000 in Slovakia and Romania.

Among Central and Eastern European countries, Hungary had the highest high-tech export share in 2007, some 25% of exports of goods was high-tech (Chart 4).[11] In the Czech Republic the high-tech export share was 15%, while in other countries in the region it was only a few per cent. Medium-tech products account for almost half of the exports of goods, with Slovakia having the highest share (medium-tech motor vehicles accounting for 25% of Slovakia's goods exports).

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[7] More detail is given in the Appendix (Table A1).

[8] I note that, compared with other countries in the region, the growth of the Hungarian exports volume of goods was favourable despite the fact that the initial share of exports of goods in GDP was the highest in Hungary. The question arises concerning how much stagnating export prices contributed to this. However, it is noteworthy that before 2000 the Hungarian export volume went up significantly, while the relative export prices were similar in the region. Stagnating export prices can be traced back to quality problems, and to low unit labour costs as well. To decide whether stagnating export prices involve a positive or a negative process, export price levels, unit labour cost levels and the relationship between these two have to be analysed.

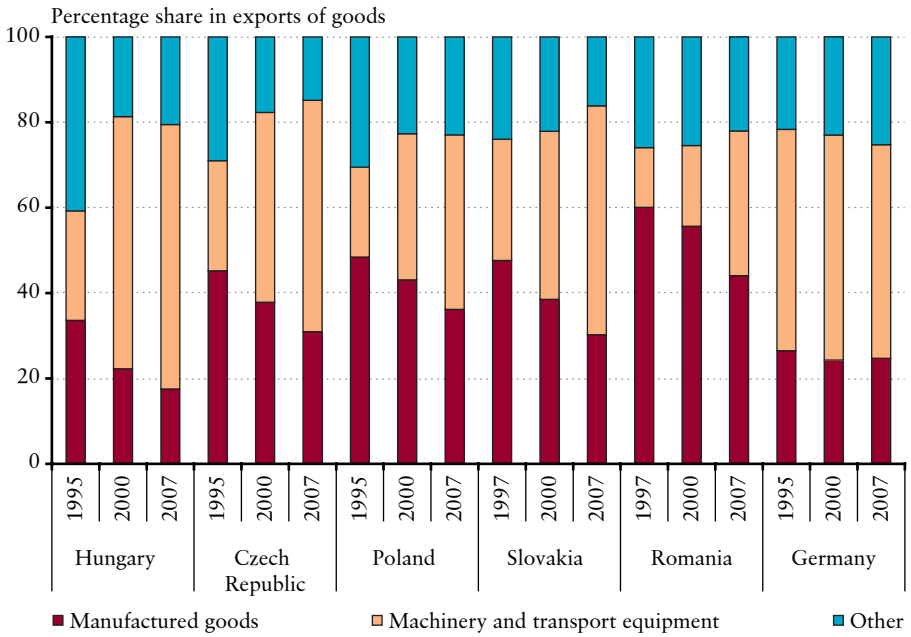
[9] Naturally goods export structure by product differ remarkably in each country, but generally machinery and transport equipment has the highest share (except, for example, in Belgium, Portugal, Spain and Ireland).

[10] Crespo–Fontoura (2007) has a similar result. In relation to the EU15 export structure, the Czech and Hungarian structures are the most similar.

[11] Among the analysed countries the highest high-tech export share is in Ireland (36%), the second highest is in Hungary (24%). More detail on methodology can be found in Appendix B1, while data can be found in Appendix A (Table A2). For more detail on technology structures see the following papers: What is high-tech trade? (2005), OECD Science, Technology and Industry Scoreboard (2007), Industrial Development Report (2009).

Chart 3

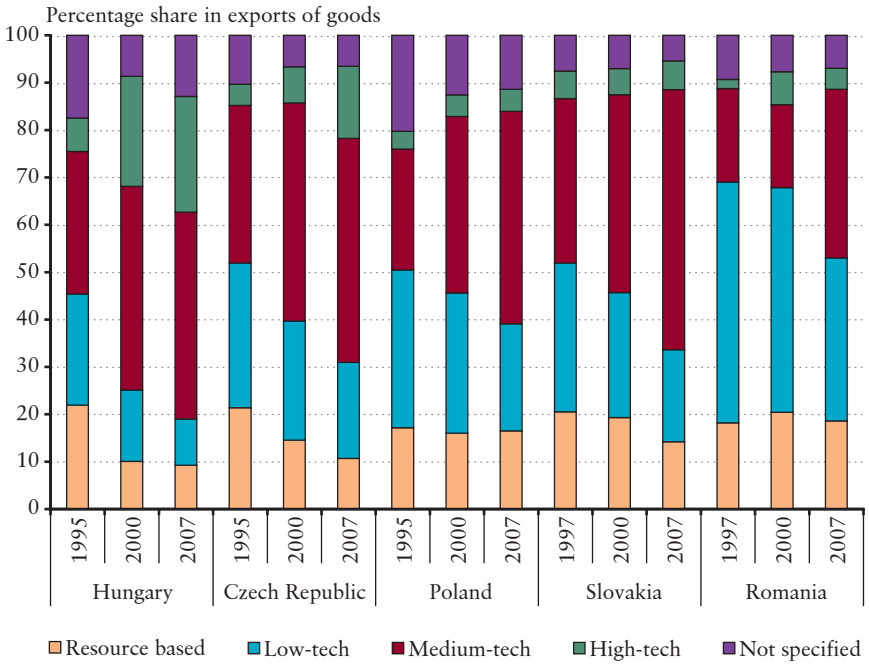
Exports of goods by product in Central and Eastern Europe and Germany



Note: The earliest available data for Romania and Slovakia is 1997. The distributions in 1995 and 1997 are based on OECD data (in US dollar), while distributions from 2000 and 2007 are based on Eurostat data (in euro). However, the distribution is mainly not affected by this. Data sources are Eurostat Easy Comext and OECD Stat (both exports of goods by SITC).

Chart 4

Technology structure of exports of goods in Central and Eastern Europe



Note: The earliest available data for Romania and Slovakia is 1997. The distributions in 1995 and 1997 are based on OECD data (in US dollar), while distributions from 2000 and 2007 are based on Eurostat data (in euro). However, the distribution is mainly not affected by this. Data sources are Eurostat Easy Comext and OECD Stat (both exports of goods by SITC).

Since 2000 the technology structure of Hungarian goods exports – similar to the product structure – has not changed significantly.[12] However, in the Czech Republic high-tech export share increased remarkably in recent years, while in other countries in the region it is still low. As high-tech products probably mean a higher price level, in the Czech Republic the rise in high-tech export share could have a positive impact on export price/unit value, but in other Central and Eastern European countries this effect is not considerable.[13]

Thus the product structure of Hungarian exports is the closest in the region to that of Western countries, and high technology is the most important in Hungary, which may indicate that Hungary's foreign trade reached its equilibrium level.[14]

Box 1: Skill and intensity structure of exports of goods

The quality of exports of goods can be described by several methods. First of all the high-tech export share can be used, which points out that the Hungarian exports have the best quality distribution in the region.

Secondly, another approach can be the skill and intensity structure of exports of goods, which was calculated by Crespo–Fontoura (2007) and Peneder (2001) (data are available in Appendix A, Tables A2 and A3, methodology description can be found in Appendix B2). Crespo–Fontoura (2007) analysed new member states' exports of goods going to the EU15 between 1995 and 2003 (changes in time and cross section as well). Here, the original methodology was expanded and the whole (EU and outside EU) export structure was analysed between 1995 and 2007.

In connection with the high-tech export share in Hungary, exports related to high-skill employees accounts for 20% in total exports of goods (Chart 5); only the Czech Republic has a higher share. The good quality is also confirmed by the fact that Hungary has the biggest proportion regarding technology driven exports, while in Hungary labour intensive technology has the smallest role in the region.

At the same time, the important role of high technology can couple with low value added because of the high import content. According to Reininger (2008), there is a strong and significant relationship between exports and imports in CEE countries, which can be traced back to significant foreign direct investment inflow and the fact that these countries usually play an intermediary role between the EU and Russia.

The increase in value added in CEE countries' industries moved similarly in recent years (Chart 6). Before 2000 the value added of office machines and computers went up significantly in Hungary and the Czech Republic, but after the millennium the dynamics slowed down. The value added of machinery, which represents an important proportion in exports, increased less in the second half of the 1990s, but significantly after 2000 in the region. The value added of telecommunications and motor vehicles also went up remarkably, especially in the second half of the 1990s. On the whole, the high technology level of Hungarian exports also means a favourable value added path which is similar to that of other CEE countries.

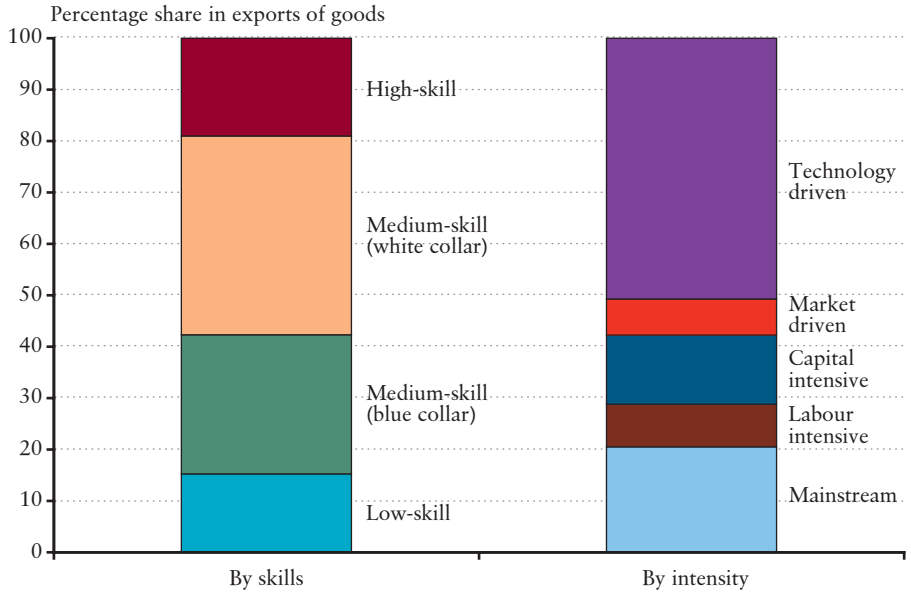
[12] At the same time, within high-tech export there was a remarkable restructuring; in Hungary the emphasis moved from computers towards telecommunications.

[13] An increase in high-tech export share goes hand in hand with an increase in unit vale compared with other countries (Fabrizio et al., 2006).

[14] According to Jakab et al. (2000), Hungary's foreign trade integrated the fastest in the region. Bussiere et al. (2005) found that Hungary's foreign trade is close to its equilibrium, and the question even arises as to whether it integrated over equilibrium into euro area.

Chart 5

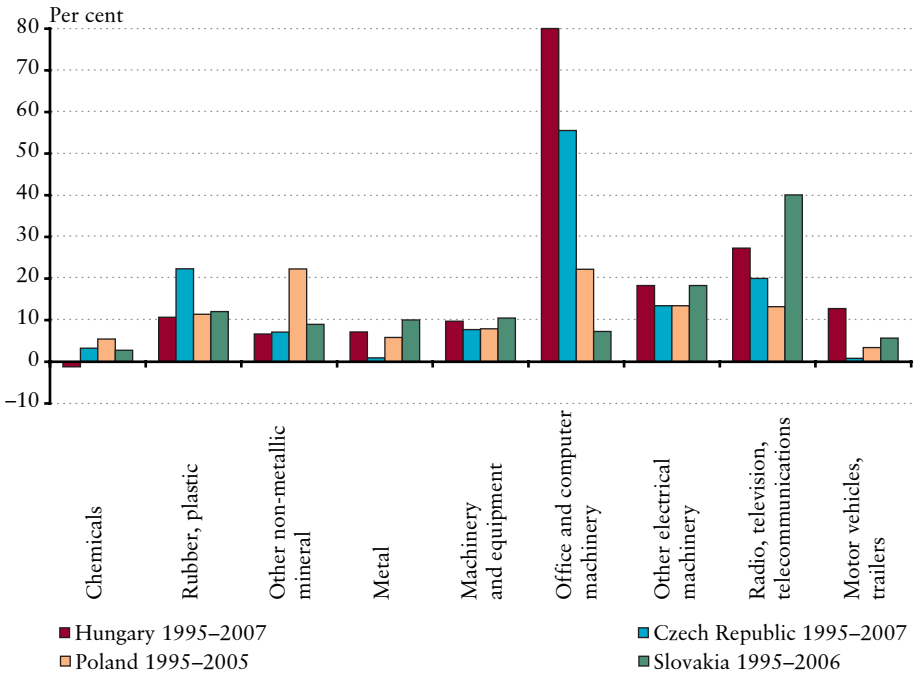
Hungarian skill and intensity export structure in 2007



Note: Data source is Eurostat Easy Comext. Industries were classified by Peneder (2001). The methodology and a description of the categories can be found in Appendix B2.

Chart 6

Value added growth by industries



Note: Data source is EU Klems.

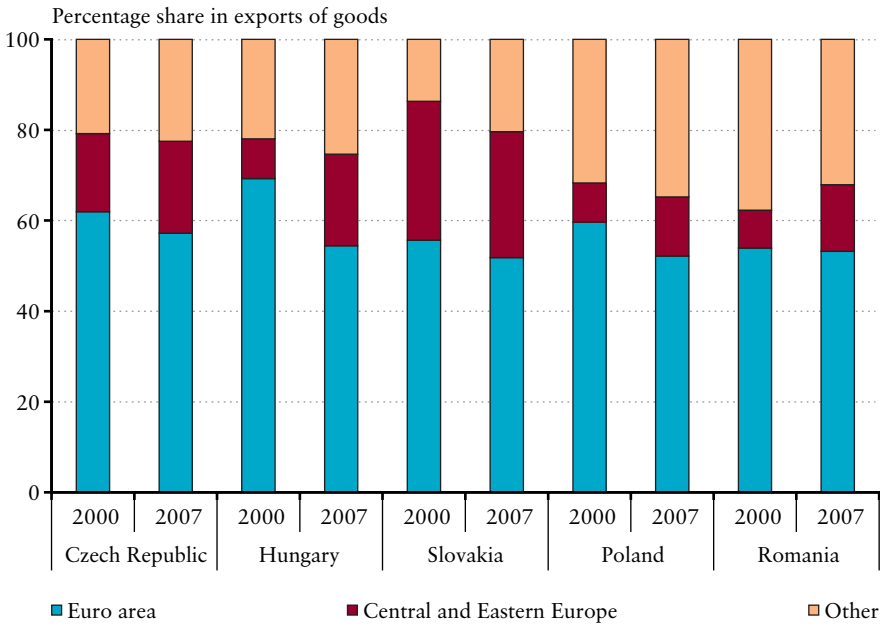
B) Structure hypothesis[15]

According to the structure hypothesis, the stagnating exports of goods price index in Hungary could be caused by the fact that Hungarian exports of goods restructured significantly outside the euro area and outside the EU, where unit value indices were more unfavourable. The unfavourable export price index outside the EU can be traced back to the proportion of high-tech products in exports.

About half of CEE countries' exports of goods goes to the euro area (Chart 7). However, in recent years a higher share of exports of goods turnover is going to other Central and Eastern European countries, and regarding Slovakia and especially Hungary third countries also play a more significant role. On the whole, Hungary faced the biggest reorientation to countries outside the euro area and the EU. Moreover, this restructuring happened to those partners where unit value indices behaved more unfavourably, consequently, this process could have a negative impact on the Hungarian export price index (Chart 8).

Chart 7

Export structure by partner country groups in Central and Eastern Europe



Note: Data source is Eurostat Easy Comext (exports of goods in euro). Euro area means EA11 in 2000 and EA13 in 2007. In 2000 Central and Eastern Europe consists of Bulgaria, the Czech Republic, Croatia, Hungary, Poland, Romania, Slovenia, Slovakia, Serbia, Montenegro and Kosovo. In 2007 Slovenia belonged to the euro area instead of CEE.

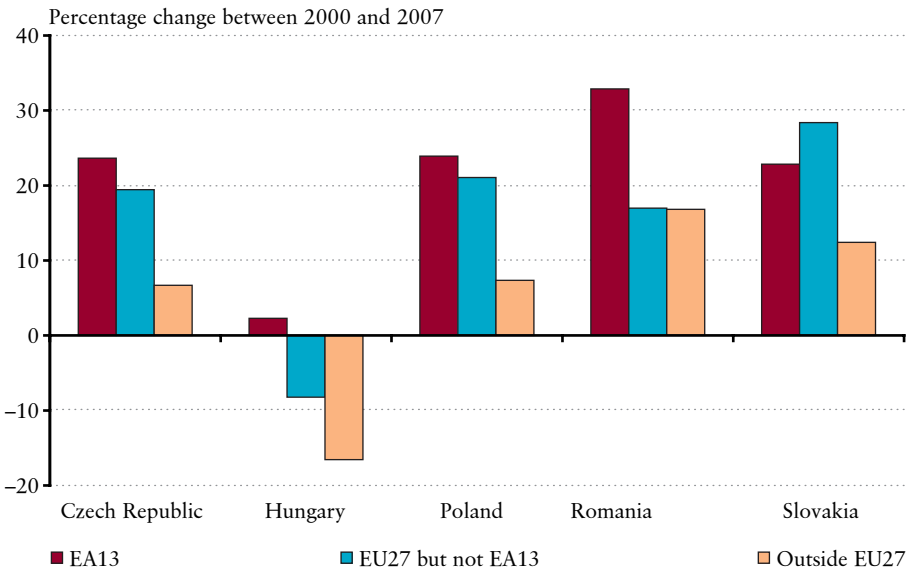
However, it is still a question as to what caused the bigger restructuring of Hungarian exports. On the one hand, the decrease in exports going to the euro area may mean that Hungary's foreign trade was integrated over equilibrium into the euro area (Bussiere et al., 2005). On the other hand, the higher role of non-EU countries can be an adaptation due to reaching the potential. Thirdly, the technology structure of Hungarian exports may provide an explanation as well.

Regarding Hungary, high-tech exports played a more important role in non-EU exports compared with EU exports already in 2000. Moreover, in recent years high-tech export share increased more in non-EU turnover than within the EU. In connection with this, the Polish and Czech market share in the EU high-tech market went up more significantly than the Hungarian one (Chart 9). The reason may be that Hungarian exporters sold the same high-tech products outside the EU at lower prices, but this hypothesis has to be tested in the future.

[15] To illustrate export-import price changes there are several statistics: exports of goods and imports of goods price index based on representative surveys and unit value indices (foreign trade statistics); implicit price indices from national accounts and non-domestic producer price indices (industry statistics). The main difference between foreign trade price indices and unit value indices is that the latter contain the composition effect as well. However, not all countries publish price indices, so unit value indices are also used for purposes of analysis. For more detail see Appendix B4.

Chart 8

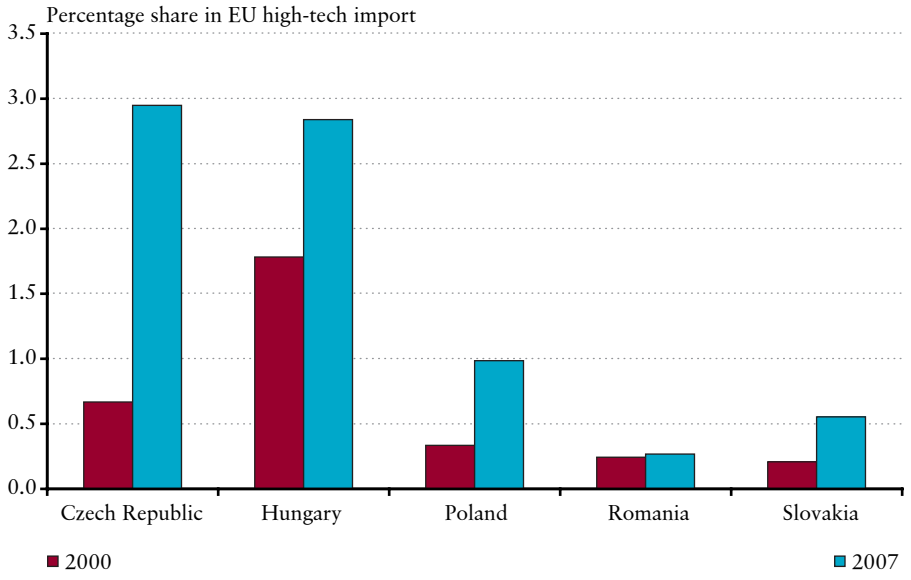
Unit value indices in Central and Eastern Europe, 2000–2007



Note: Data source is Eurostat and own calculation. Unit value indices on the chart show not only price changes but contain the composition effect as well.

Chart 9

Central and Eastern European countries' share in EU high-tech export market



Note: Data source is Eurostat Easy Comext (exports of goods by SITC in euro). The chart shows the proportion of a country's high-tech exports of goods going to the EU in the total EU high-tech imports of goods coming from all EU countries. High-tech products are categorised by Industrial Development Report (UN, 2009).

C) Export specialisation[16]

Export performance (in value) can be negatively affected if a country specialises in industries whose export prices are unfavourable or, compared with other countries, are more unfavourable. In the latter case export volume can increase the dynamic, but export growth in value can be lower.

Specialisation methodology is based on Baumann–di Mauro (2007), which methodology was used for the first time for single Central and Eastern European countries. In addition, not only the relationship between import demand and specialisation is analysed – as in the cited paper – but also the relationship between export price indices and specialisation. Although Baumann-di Mauro (2007) compared a country's exports with world trade, in this paper the EU market is in focus. As a considerable part (in Hungary about 80%) of CEE countries' exports goes to EU member states, this paper covers most of their export performance.

Box 2: Specialisation

Specialisation means revealed comparative advantage defined by Balassa (1965). A CEE country's exports of goods to the EU by industries is compared with the exports of goods of the EU from EU members by industries. Formula:

$$RCA_{c,s} = \frac{x_{c,s} / \sum_s x_{c,s}}{x_{EU,s} / \sum_s x_{EU,s}}$$

The numerator is exports of goods to the EU of a country c in industry s as a proportion of country c's total exports of goods going to the EU. The denominator is exports of goods of the EU in an industry s as a proportion of total exports of goods of the EU from all member states.

If specialisation in an industry is greater than 1, the country has a revealed comparative advantage in that industry relative to the EU, so specialisation is relatively higher there. The formula is normalised by the within-EU exports of goods' industry structure, consequently, cycles in the EU market are taken into consideration.

Specialisation and price indices between 2000 and 2007[17]

In this chapter the export price indices of main industries are analysed after 2000 and the question is whether those industries' specialisation increased which had a favourable export price index in the period.

There are three industries (chemicals, metal, machinery) whose export prices increased in the region, while specialisation remained stable (Chart 10). The export price of the Hungarian chemicals industry increased more than that of other countries in the region, but specialisation – similar to other countries – has not increased. The Czech metal export price grew the fastest, but specialisation decreased slightly in all analysed countries. Regarding machinery, Czech export price growth was also the highest, and the Hungarian export price increased less. Nevertheless, specialisation has not changed significantly in any of the countries.

One of the most important export products is represented by motor vehicles: in 2007 it amounted for about 20 per cent of manufacturing exports of goods going to the EU (with the highest share in Slovakia). However, both specialisation and export prices remained stable during 2000–2007 in all three countries, consequently, on the whole the motor vehicles industry only slightly contributed to export price growth.

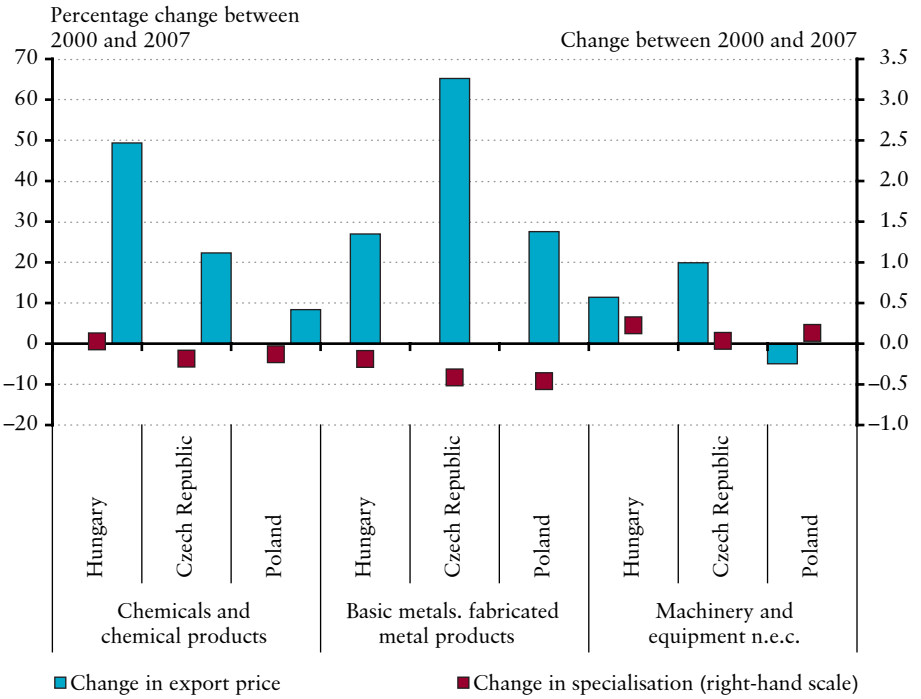
[16] More detail on specialisation and its relationship with import demand can be found in Baumann–di Mauro (2007) and Forster–di Mauro (2008). Date are available in Appendix A (Table A5), more detail on methodology can be found in Appendix B2 and Box 2.

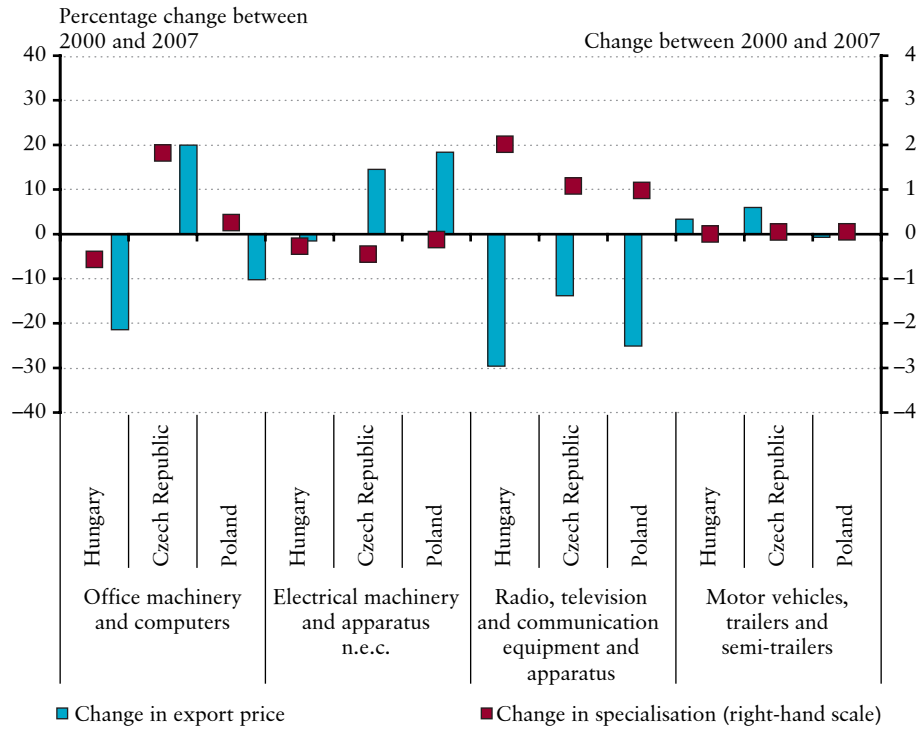
[17] Manufacturing non-domestic producer price indices are used (Eurostat industry statistics), which do not contain the composition effect. Data for Slovakia and Romania are restricted, so primarily the Czech Republic, Poland and Hungary are analysed. For more detail on export prices and unit value indices see: Baghy-Endrődiné (2007), Beuerlein (1999), Csizmazia (2005), Explanatory Notes on Methodology Goods Export and Import Price Indices, Handbook on Price and Volume Measures in National Accounts (2001), Pisa (2008) and Pötzsch (2005).

In three industries (office machinery and computers, other electrical equipment and telecommunications) the Hungarian export price index was more unfavourable than that of the Czech Republic and Poland.

Chart 10

Specialisation and price indices in Central and Eastern Europe, 2000–2007





Note: Specialisation compares a country's exports of goods going to the EU with the exports of goods of the EU from all EU countries (by industries). Price indices mean manufacturing non-domestic price indices, which do not contain the composition effect. Data for specialisation calculation are from Eurostat Easy Comext, Comext Online and UN Comtrade. Data for export prices are from Eurostat industry statistics. For more detail on methodology see Box 2 and Appendices B2 and B4.

The export prices of office machinery and computers decreased by 20 per cent in Hungary after 2000. At the same time it rose by 20 per cent in the Czech Republic and decreased by 10 per cent in Poland. Moreover, specialisation for this industry rose significantly in the Czech Republic, consequently, in Czech exports there was an increase in the share of an industry with dynamic export price growth. Although regarding Hungary the role of this industry diminished considerably, the large decrease in export price still implies that, on the whole, the office machines and computers industry may have negatively affected the Hungarian export price index. Polish specialisation remained stable.

In Hungary the export price index of other electrical equipment was also very unfavourable. The Czech and Polish price index grew by 15-20 per cent, but in Hungary it did not change. Specialisation decreased somewhat in all countries.

The export prices of telecommunications fell in all countries (the decline reached 20-30 per cent); in addition, specialisation climbed everywhere as well. On the whole, this industry negatively affected export prices in the region. However, as the price decline and the specialisation increase was the biggest in Hungary, the effect was the most unfavourable there as well.

Specialisation and demand in the periods 1995–1999 and 2000–2007

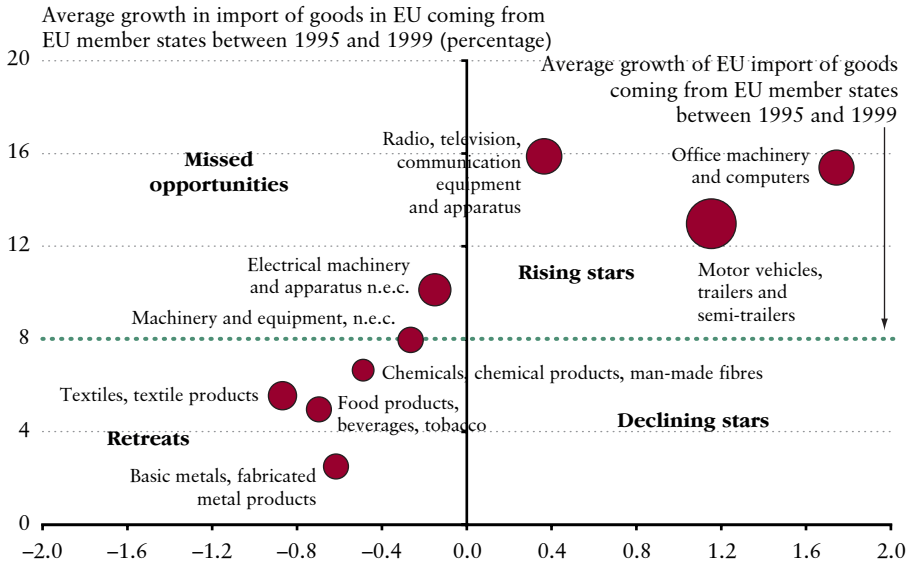
In this chapter the main question is whether specialisation goes up in connection with EU import demand increase. Four categories are classified by import demand and specialisation. Missed opportunities and rising stars are fast growing industries whose specialisation decreases and increases. Retreats and falling stars mean industries with low import demand growth and decreasing and increasing specialisation.

In 1995–1999 the role of telecommunications, office machines and computers, and motor vehicles increased in Hungary, and EU import demand for these industries' products went up more than the average (Chart 11). At the same time, there were several industries with declining specialisation and under-average import demand growth rate, for example, the textiles industry and the food, beverage and tobacco industry. Moreover, there was no industry which became more substantial in spite of the low import demand growth. Import demand for other electrical equipment grew considerably, but specialisation declined slightly.

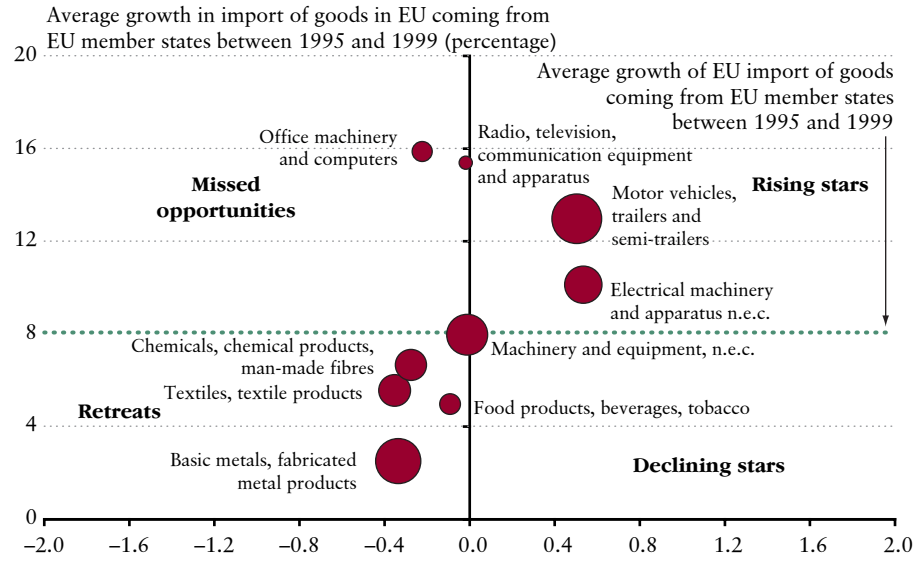
Before the millennium there were two industries in the Czech Republic which experienced both growing import demand and specialisation: motor vehicles and other electrical equipment. EU import demand for office machines and computers, as well as telecommunications increased significantly, but these industries did not come to the forefront. The textiles industry and the food, beverage and tobacco industry became less important, in parallel with an under-average demand growth rate.

Chart 11

Specialisation and import demand in Central and Eastern Europe, 1995–1999[18]



Change in Hungarian EU exports of goods specialization between 1995 and 1999



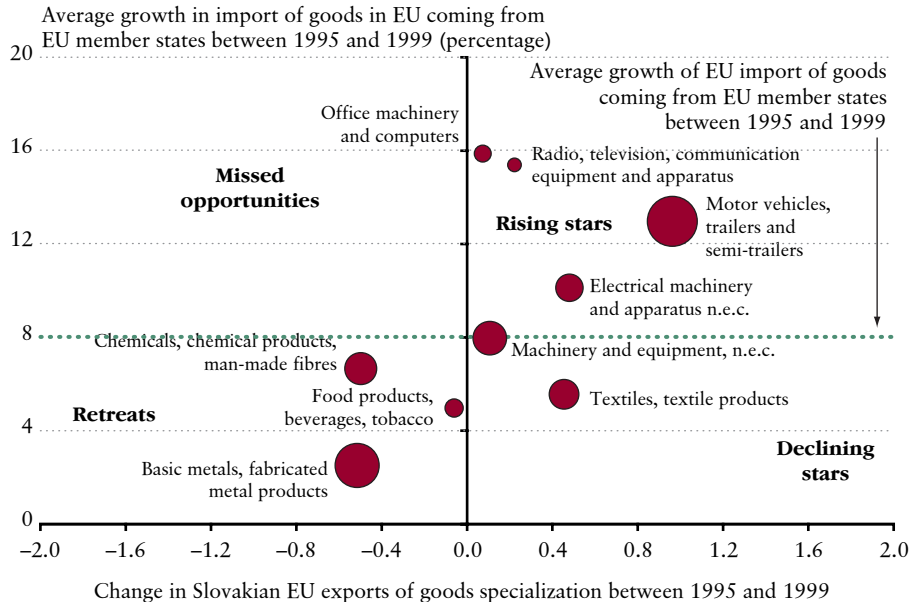
Change in Czech EU exports of goods specialization between 1995 and 1999

Note: The horizontal axis shows change in specialisation between 1995 and 1999. Specialisation compares a country's exports of goods to the EU with the exports of goods of the EU from all EU countries (by industries). More detail on specialisation can be found in Box 2 and Appendix B2. The vertical axis shows the growth rate of EU manufacturing imports of goods coming from EU member states, the green line is the yearly average change between 1995 and 1999 (8.2%). The bubble size refers to the share of industry in manufacturing exports of goods in 1999. Data sources are Eurostat Easy Comext, Eurostat Comext Online and UN Comtrade. Industries with a relatively high share in total exports are shown in the chart.

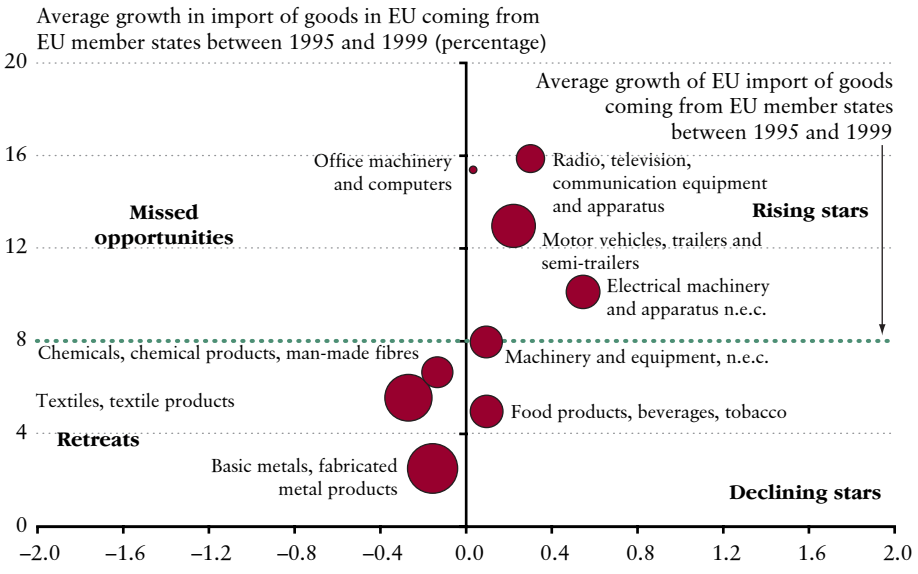
[18] The methodology source for charts 11-12 and source for four category names is Baumann–di Mauro (2007).

Chart 11

Specialisation and import demand in Central and Eastern Europe, 1995–1999 (cont'd)



Change in Slovakian EU exports of goods specialization between 1995 and 1999

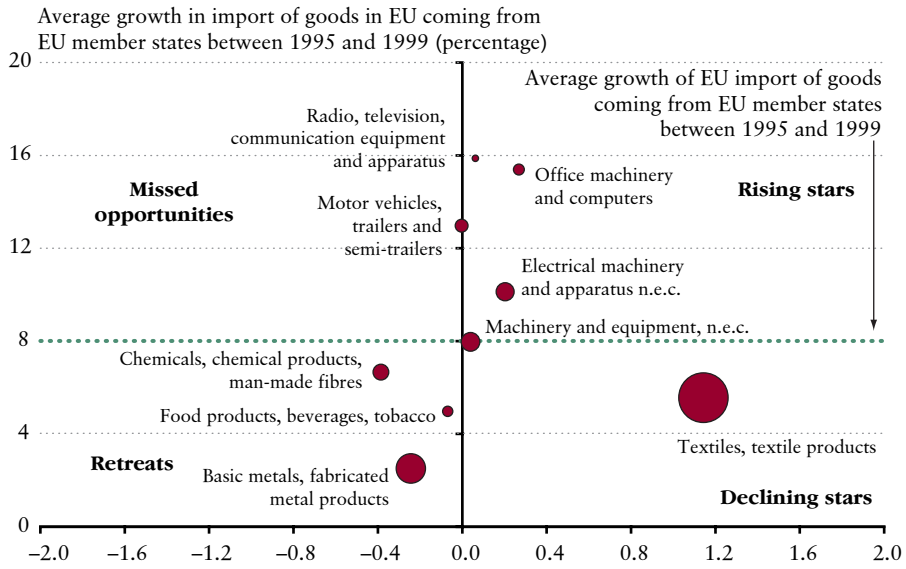


Change in Polish EU exports of goods specialization between 1995 and 1999

Note: The horizontal axis shows change in specialisation between 1995 and 1999. Specialisation compares a country's exports of goods to the EU with the exports of goods of the EU from all EU countries (by industries). More detail on specialisation can be found in Box 2 and Appendix B2. The vertical axis shows the growth rate of EU manufacturing imports of goods coming from EU member states, the green line is the yearly average change between 1995 and 1999 (8.2%). The bubble size refers to the share of industry in manufacturing exports of goods in 1999. Data sources are Eurostat Easy Comext, Eurostat Comext Online and UN Comtrade. Industries with a relatively high share in total exports are shown in the chart.

Chart 11

Specialisation and import demand in Central and Eastern Europe, 1995–1999 (cont'd)



Note: The horizontal axis shows change in specialisation between 1995 and 1999. Specialisation compares a country's exports of goods to the EU with the exports of goods of the EU from all EU countries (by industries). More detail on specialisation can be found in Box 2 and Appendix B2. The vertical axis shows the growth rate of EU manufacturing imports of goods coming from EU member states, the green line is the yearly average change between 1995 and 1999 (8.2%). The bubble size refers to the share of industry in manufacturing exports of goods in 1999. Data sources are Eurostat Easy Comext, Eurostat Comext Online and UN Comtrade. Industries with a relatively high share in total exports are shown in the chart.

Before the millennium specialisation in motor vehicles went up considerably in Slovakia, in parallel with the fast import demand growth. The role of other electrical equipment and telecommunications rose as well, but still remained insignificant by 1999. The food, beverage and tobacco industry became less important. However the share of the textiles industry in total exports increased despite the fact that the increase in the latter's import demand exceeded that in the former only slightly.

In Poland specialisation in other electrical equipment increased the most. Specialisation in telecommunications and motor vehicles went up, but the latter by a much smaller amount than that of Hungary. Although EU import demand for office machines and computers grew the second fastest after telecommunications, its specialisation remained stable and its role is still very low. As with other countries in the Visegrad Group, the role of the textile industry declined, but the food, beverage and tobacco industry became more important (in 1999 it had the highest share in Polish exports in the region).

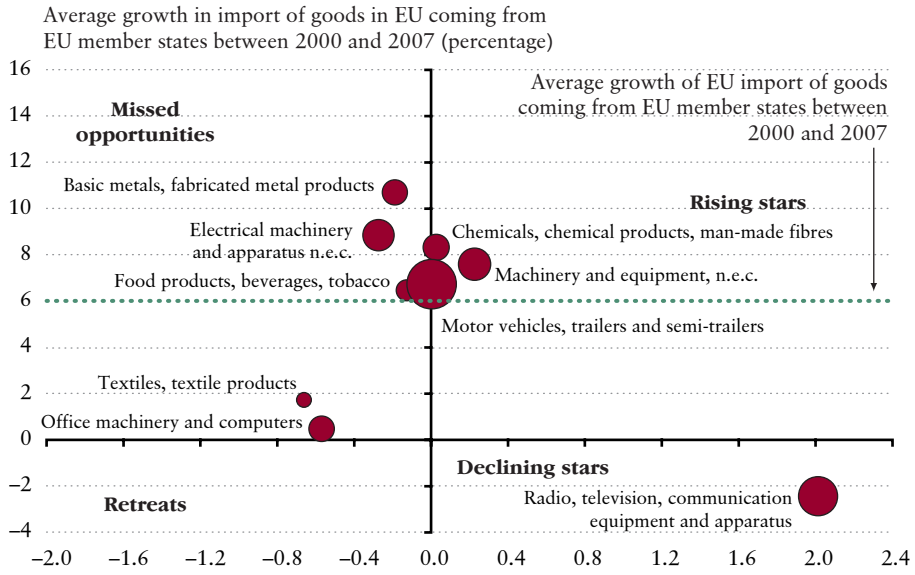
Romania's export specialisation was the least unfavourable before the millennium. Industries with high import demand growth did not play a major role in Romanian exports. Only specialisation in office machines and computers and other electrical equipment increased slightly. However the textile industry became much more substantial, despite the fact that import demand growth was under average. The role of the food, beverage and tobacco industry has not changed significantly.

On the whole, in the second half of the 1990s Hungary took the greatest advantage of the relationship between specialisation and import demand, as there were several industries with fast growing import demand and increasing specialisation as well. At the same time the role of several fast increasing industries went up in the Czech Republic, Slovakia and Poland as well. However, Romania has not significantly increased specialisation in industries with above-average increasing EU import demand.

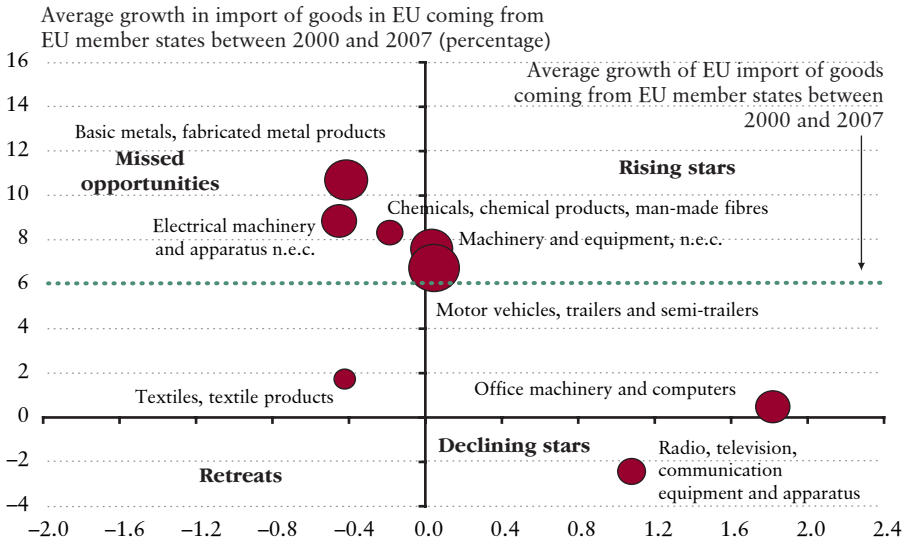
After the millennium telecommunications gained a bigger role in Hungary, although import demand for its products declined slightly in the EU (Chart 12). Specialisation in office machines and computers decreased, while demand stagnated. The role of motor vehicles and chemicals did not change remarkably, in spite of the fast increasing EU demand. Imports of instruments and machinery rose above the average; these industries are playing an increasingly greater role. Specialisation in other electrical equipment fell, despite the dynamic import demand growth.

Chart 12

Specialisation and import demand in Central and Eastern Europe, 2000–2007[19]



Change in Hungarian EU exports of goods specialization between 2000 and 2007



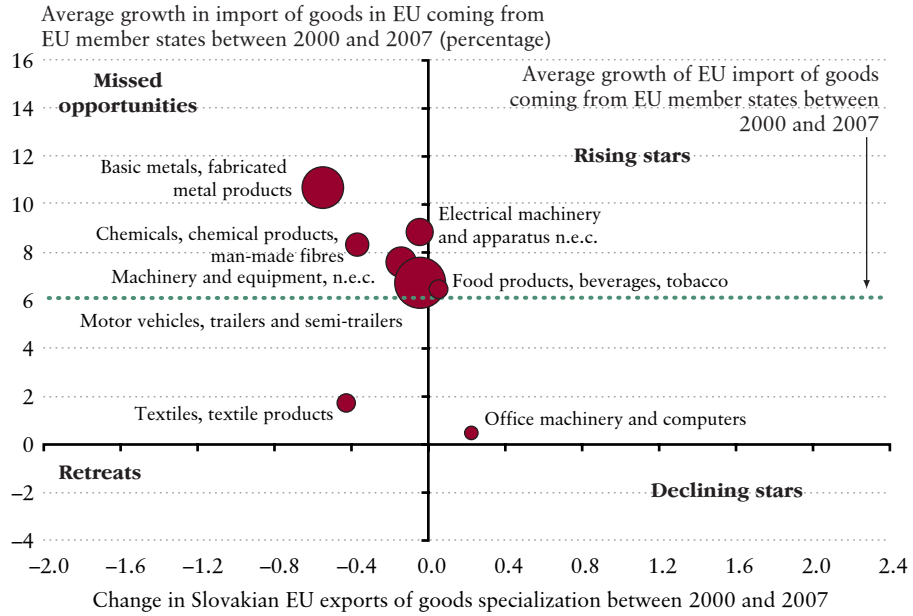
Change in Czech EU exports of goods specialization between 2000 and 2007

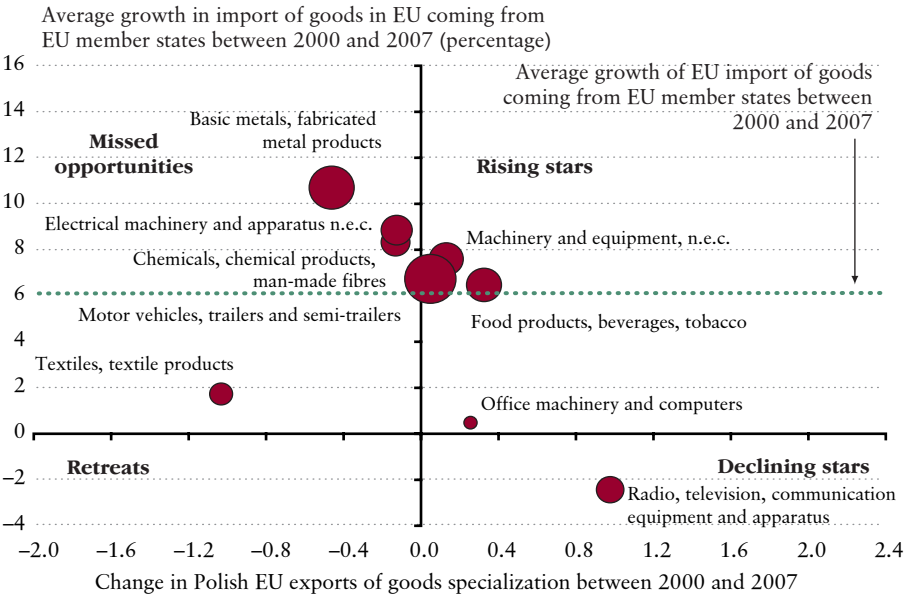
Note: The horizontal axis shows change in specialisation between 2000 and 2007. Specialisation compares a country's exports of goods to the EU with the EU exports of goods from all EU countries (by industries). More detail on specialisation can be found in Box 2 and Appendix B2. The vertical axis shows the growth rate of EU manufacturing imports of goods coming from EU member states, the green line is the yearly average change between 2000 and 2007 (6%). The bubble size refers to the share of industry in manufacturing exports of goods in 2007. Data sources are Eurostat Easy Comext, Eurostat Comext Online and UN Comtrade. Industries with a relatively high share in total exports are shown in the chart.

[19] The methodology source for charts 11-12 and source for four category names is Bauman–di Mauro (2007).

Chart 12

Specialisation and import demand in Central and Eastern Europe, 2000–2007 (cont'd)

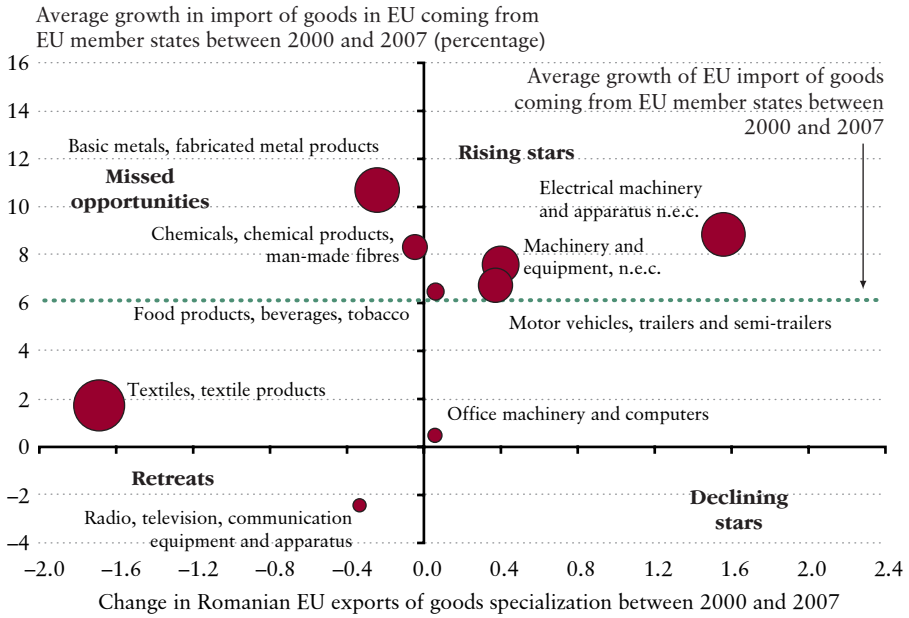




Note: The horizontal axis shows change in specialisation between 2000 and 2007. Specialisation compares a country's exports of goods to the EU with the EU exports of goods from all EU countries (by industries). More detail on specialisation can be found in Box 2 and Appendix B2. The vertical axis shows the growth rate of EU manufacturing imports of goods coming from EU member states, the green line is the yearly average change between 2000 and 2007 (6%). The bubble size refers to the share of industry in manufacturing exports of goods in 2007. Data sources are Eurostat Easy Comext, Eurostat Comext Online and UN Comtrade. Industries with a relatively high share in total exports are shown in the chart. Change in Slovakian specialisation for radio, television, communication equipment and apparates increased by a large amount so that it is out of the shown range.

Chart 12

Specialisation and import demand in Central and Eastern Europe, 2000–2007 (cont'd)



Note: The horizontal axis shows change in specialisation between 2000 and 2007. Specialisation compares a country's exports of goods to the EU with the EU exports of goods from all EU countries (by industries). More detail on specialisation can be found in Box 2 and Appendix B2. The vertical axis shows the growth rate of EU manufacturing imports of goods coming from EU member states, the green line is the yearly average change between 2000 and 2007 (6%). The bubble size refers to the share of industry in manufacturing exports of goods in 2007. Data sources are Eurostat Easy Comext, Eurostat Comext Online and UN Comtrade. Industries with a relatively high share in total exports are shown in the chart.

In the Czech Republic – less than in Hungary – the proportion of telecommunications in exports increased alongside declining import demand. The share of office machines and computers went up, although demand remained stable. The significance of machinery and motor vehicles has not changed. At the same time, other electrical equipment and metal became less important, despite the fast growing demand. On the whole, Czech specialisation was not more favourable than that of Hungary, but generally industries with favourable demand play a bigger role (metal and machinery industry).

The importance of telecommunications rose outstandingly in Slovakia (partly due to the basis effect). Motor vehicles play an important role in exports (this industry has the highest share in Slovakia among CEE countries) and EU import demand for motor vehicles increased slightly above the average. Specialisation in other electrical machinery, chemicals and machinery declined or stagnated, while demand grew remarkably. The role of metal industry declined, despite the fast growing import demand, but this industry was the most important in Slovakia in 2007 compared with other countries in the region.

In Poland specialisation in industries with above-average import demand growth increased somewhat (for example machinery, rubber and plastic industry, food, beverage and tobacco industry). The latter was the most important in Poland among CEE countries in 2007 as well. Motor vehicles, which play an important role in exports, did not become more considerable. Specialisation in chemicals and other electrical machinery fell, although EU imports increased dynamically.

After the millennium primarily Romania's specialisation increased in those industries whose products faced above-average demand growth. However, it is important to note that restructuring of export specialisation began later compared with other countries. The role of other electrical machinery, motor vehicles and machinery went up as well. Telecommunications – which faced declining import demand – lost ground, while specialisation in office machines and computers – which faced stagnating demand – has not changed significantly. On the whole, the Romanian export structure still differs considerably in 2007 from other Central and Eastern European countries and Western Europe.

To sum up, between 2000 and 2007 Hungary's specialisation did not rise in industries with fast growing demand. However, this is generally true in all countries, the only exception being Romania. In several countries dynamic export growth was not due to an increase in specialisation linked to fast growing import demand, but due to some industries with an outstanding proportion in exports (for example motor vehicles), with stagnating export specialisation and average import demand growth, having such a large share in exports that they positively affected overall export performance.

4 Summary and future research

In the second half of the 1990s Hungary's market share in that exports of goods increased the fastest among Central and Eastern European countries. However, after the millenium that growth was the slightest in Hungary. After 2000 real exchange rate appreciation was similar in all countries (except Poland). Hence different export market share dynamics probably cannot be explained by the real exchange rate, but by structural reasons. The paper's aim was to answer the question whether and by how much Hungary's slowdown in export market share growth after 2000 is due to reaching equilibrium or structural reasons.

Main findings:

- As the Hungarian product and technology export structure was already in 2000 very similar to the Western European one, the slowdown can be viewed as a natural process.

- Reorientation of exports to the non-euro area and non-EU countries was the highest in Hungary. Moreover, this restructuring occurred in relation to partner countries with less favourable unit value indices, consequently, this fact could affect Hungarian export prices negatively. In the case of non-EU countries Hungary's unit value decreased sharply which can be traced back to the fact that high-tech export share grew faster (compared with EU turnover). However, the same high-tech products could be sold at a lower price and this could negatively affect the Hungarian export price index.

- Export specialisation could also contribute to stagnating Hungarian export prices. The export prices of chemicals, metal industry and machinery rose, but their specialisation remained stable. The export prices of the most important industry, motor vehicles, did not change significantly. In three industries (office machines and computers, telecommunications and other electrical machinery) Hungarian export price indices were more unfavourable than elsewhere in the region.

- In the second half of the 1990s specialisation in industries with outstanding import demand growth increased primarily in Hungary. Nevertheless, after the millennium the role of those industries whose EU import demand went up above the average did not grow.

In view of the analysis of export structure and specialisation in Central and Eastern European countries, the slowdown in exports of goods after the millennium can be viewed partly a natural process, but partly it is due to structural reasons.

Some further future research areas:

- Specialisation methodology (Baumann–di Mauro, 2007) was used for single CEE countries for the first time (comparing not with world trade, but with the EU market). Later, analysis of the specialisation of non-EU exports could be interesting as well.

- The main focus was on export price indices, but in the future relative export price levels/unit value levels will have to be examined.

- Although import demand can have a large impact on export specialisation, other factors (for example unit labour costs) have to be considered. Similarly with foreign trade prices, it is also important to understand levels. In addition, unit labour costs should be confronted with export prices.

- The main focus was on exports, but import structure and specialisation can also be a future research area.

Appendix A

Table A1

Terms of trade and its components in Central and Eastern Europe (1995=100)

Terms of trade	1995	2000	2007	Terms of trade (services)	1995	2000	2007
Czech Republic	100	106	112	Czech Republic	100	124	156
Hungary	100	98	97	Hungary	100	112	131
Poland	100	91	96	Poland	100	90	102
Romania	100	110	140	Romania	100	32	29
Slovakia	100	99	94	Slovakia	100	97	90
Terms of trade (goods)	**1995**	**2000**	**2007**	**Export price index**	**1995**	**2000**	**2007**
Czech Republic	100	101	104	Czech Republic	100	117	140
Hungary	100	96	90	Hungary	100	112	116
Poland	100	90	93	Poland	100	118	157
Romania	100	128	171	Romania	100	116	154
Slovakia	100	97	93	Slovakia	100	116	158
Export price index (goods)	**1995**	**2000**	**2007**	**Export price index (services)**	**1995**	**2000**	**2007**
Czech Republic	100	113	131	Czech Republic	100	133	196
Hungary	100	110	109	Hungary	100	116	142
Poland	100	113	150	Poland	100	140	183
Romania	100	114	150	Romania	100	131	178
Slovakia	100	114	156	Slovakia	100	114	156
Import price index	**1995**	**2000**	**2007**	**Import price index (goods)**	**1995**	**2000**	**2007**
Czech Republic	100	111	125	Czech Republic	100	112	126
Hungary	100	115	120	Hungary	100	115	121
Poland	100	129	164	Poland	100	126	162
Romania	100	106	110	Romania	100	89	88
Slovakia	100	118	168	Slovakia	100	118	168
Import price index (services)	**1995**	**2000**	**2007**				
Czech Republic	100	107	126				
Hungary	100	104	108				
Poland	100	155	180				
Romania	100	410	616				
Slovakia	100	118	172				

Note: Source of data is AMECO. Price indices are implicit price indices from national accounts, which can contain the composition effect depending on the foreign trade price index/unit value index methodology in the given country. Data in the table are euro based, 1995=100

Table A2

Technology structure of exports of goods (percentage)

Czech Republic	1995	2000	2007	Belgium	1995	2000	2007
Resource based	21.4	14.5	10.7	Resource based	22.3	26.1	25.2
Low-tech	30.5	25.2	20.3	Low-tech	17.0	15.8	15.2
Medium-tech	33.3	46.0	47.3	Medium-tech	37.9	38.2	35.0
High-tech	4.5	7.6	15.2	High-tech	6.8	10.7	14.7
Not specified	10.3	6.7	6.6	Not specified	16.0	9.2	9.8
Hungary	**1995**	**2000**	**2007**	**Germany**	**1995**	**2000**	**2007**
Resource based	21.9	10.1	9.2	Resource based	12.0	11.3	12.2
Low-tech	23.5	15.1	9.8	Low-tech	14.8	13.0	13.9
Medium-tech	30.1	43.0	43.7	Medium-tech	47.9	49.1	47.7
High-tech	7.0	23.2	24.4	High-tech	12.9	17.6	16.7
Not specified	17.5	8.6	12.9	Not specified	12.4	9.0	9.6
Poland	**1995**	**2000**	**2007**	**Sweden**	**1995**	**2000**	**2007**
Resource based	17.2	16.0	16.5	Resource based	22.4	20.2	21.9
Low-tech	33.3	29.6	22.6	Low-tech	14.7	12.8	14.9
Medium-tech	25.5	37.3	44.8	Medium-tech	33.5	34.4	40.8
High-tech	3.7	4.5	4.7	High-tech	18.5	24.7	17.8
Not specified	20.3	12.6	11.4	Not specified	11.0	7.8	4.6
Slovakia	**1997**	**2000**	**2007**	**Finland**	**1995**	**2000**	**2007**
Resource based	20.5	19.3	14.2	Resource based	38.3	32.4	27.5
Low-tech	31.4	26.4	19.4	Low-tech	12.7	9.8	10.9
Medium-tech	34.7	41.8	54.9	Medium-tech	26.2	23.2	29.5
High-tech	5.8	5.5	6.1	High-tech	16.8	29.7	20.7
Not specified	7.5	7.0	5.4	Not specified	6.0	4.9	11.3
Romania	**1997**	**2000**	**2007**	**Portugal**	**1995**	**2000**	**2007**
Resource based	18.2	20.4	18.6	Resource based	24.2	21.0	23.8
Low-tech	50.8	47.4	34.4	Low-tech	39.5	33.2	26.6
Medium-tech	19.7	17.5	35.6	Medium-tech	27.7	34.9	31.5
High-tech	1.9	6.9	4.4	High-tech	5.4	6.4	7.6
Not specified	9.3	7.7	6.9	Not specified	3.2	4.5	10.5
Austria	**1995**	**2000**	**2007**	**Spain**	**1995**	**2000**	**2007**
Resource based	15.8	14.7	15.3	Resource based	17.5	18.4	19.6
Low-tech	24.5	22.4	21.6	Low-tech	16.7	15.9	15.7
Medium-tech	38.1	41.2	41.8	Medium-tech	44.3	44.5	43.0
High-tech	8.7	14.7	13.0	High-tech	6.9	8.1	8.5
Not specified	12.8	7.0	8.3	Not specified	14.7	13.1	13.2
Slovenia	**1995**	**2000**	**2007**	**Ireland**	**1995**	**2000**	**2007**
Resource based	-	15.1	12.7	Resource based	25.7	29.4	36.2
Low-tech	-	27.5	22.1	Low-tech	13.3	9.1	7.0
Medium-tech	-	41.1	45.6	Medium-tech	12.9	11.6	12.2
High-tech	-	9.7	11.0	High-tech	32.7	40.5	36.6
Not specified	-	6.5	8.6	Not specified	15.5	9.4	8.1

Note: Source of data for 1999–2007 is Eurostat Easy Comext (exports of goods by SITC products in euro) and for 1995–1998 OECD Stat (exports of goods by SITC products in US Dollar). The earliest data for Romania and Slovakia in OECD Stat is from 1997, and Slovenia is not included at all. The technology structure is not affected by the fact that data are in euro or US dollar. SITC products are categorized by UN technology methodology (Industrial Development Report, 2009). For more detail on methodology see Appendix B1.

Table A3

Skill structure of manufacturing exports of goods (percentage)

Czech Republic	1995	2000	2007	Belgium	1995	2000	2007
Low-skill	38.2	26.9	21.4	Low-skill	34.3	27.8	27.5
Medium-skill (blue collar)	23.3	31.6	30.3	Medium-skill (blue collar)	24.9	23.0	18.8
Medium-skill (white collar)	24.7	26.9	25.0	Medium-skill (white collar)	29.4	32.7	31.7
High-skill	13.1	14.3	23.0	High-skill	10.9	15.1	21.3
Hungary	**1995**	**2000**	**2007**	**Germany**	**1995**	**2000**	**2007**
Low-skill	45.0	21.0	15.2	Low-skill	21.6	18.7	19.5
Medium-skill (blue collar)	13.8	25.3	26.9	Medium-skill (blue collar)	23.8	26.2	27.3
Medium-skill (white collar)	31.4	32.4	38.4	Medium-skill (white collar)	31.2	30.2	27.1
High-skill	9.6	20.7	18.9	High-skill	23.3	24.6	25.4
Poland	**1995**	**2000**	**2007**	**Sweden**	**1995**	**2000**	**2007**
Low-skill	43.9	32.9	28.9	Low-skill	14.6	13.8	17.7
Medium-skill (blue collar)	28.2	35.7	35.7	Medium-skill (blue collar)	25.1	21.9	24.6
Medium-skill (white collar)	18.6	23.0	25.1	Medium-skill (white collar)	38.1	45.3	30.6
High-skill	7.5	7.4	9.1	High-skill	18.9	18.7	25.0
Slovakia	**1995**	**2000**	**2007**	**Finland**	**1995**	**2000**	**2007**
Low-skill	42.9	29.5	22.9	Low-skill	15.5	13.1	17.8
Medium-skill (blue collar)	17.3	31.1	34.2	Medium-skill (blue collar)	17.1	13.6	15.9
Medium-skill (white collar)	30.3	29.7	33.2	Medium-skill (white collar)	52.3	61.1	46.7
High-skill	9.4	9.7	9.7	High-skill	15.1	12.2	19.1
Romania	**1995**	**2000**	**2007**	**Portugal**	**1995**	**2000**	**2007**
Low-skill	50.3	53.6	39.2	Low-skill	46.1	40.7	38.7
Medium-skill (blue collar)	17.8	17.5	24.2	Medium-skill (blue collar)	20.6	24.5	25.4
Medium-skill (white collar)	24.6	22.9	27.0	Medium-skill (white collar)	28.5	28.0	26.5
High-skill	7.0	6.1	9.4	High-skill	4.7	6.8	8.5
Austria	**1995**	**2000**	**2007**	**Spain**	**1995**	**2000**	**2007**
Low-skill	29.1	24.5	26.4	Low-skill	31.7	28.8	29.8
Medium-skill (blue collar)	26.4	27.2	29.1	Medium-skill (blue collar)	34.2	34.5	31.6
Medium-skill (white collar)	24.8	27.3	22.1	Medium-skill (white collar)	22.5	25.0	24.9
High-skill	19.1	20.3	21.5	High-skill	11.2	11.7	13.2
Slovenia	**1995**	**2000**	**2007**	**Ireland**	**1995**	**2000**	**2007**
Low-skill	32.1	27.3	23.9	Low-skill	28.7	12.1	12.8
Medium-skill (blue collar)	28.3	29.5	34.1	Medium-skill (blue collar)	3.6	2.5	2.3
Medium-skill (white collar)	28.3	30.2	23.7	Medium-skill (white collar)	31.9	47.7	46.7
High-skill	11.3	13.0	18.2	High-skill	35.8	37.7	38.2

Note: Source of data for 1999–2007 is Eurostat Easy Comext (exports of goods by CN-8 products in euro). Data source for 1995–1998 is Eurostat Comext Online for Austria, Belgium, Germany, Sweden, Finland and Portugal (exports of goods by CN-8 products in euro), respectively UN Comtrade for Central and Eastern European countries (exports of goods by HS-6). The earliest data for Slovakia and Poland in Easy Comext is from 2004, consequently, data for 1999–2003 come from UN Comtrade. The time series of Belgium for 1995–1998 contains Luxemburg as well. Easy Comext data were converted to CPA-3 structure by the conversion file of Eurostat. UN Comtrade data were converted to CPA-3 structure by Evangelos Pongas (Eurostat). CPA-3 industries are categorised according to skill groups by Peneder (2001). There is no data available for the Czech Republic in 1997. In some years the sum of the skill categories do not sum up to 100 per cent as there are non-specified industries. More detail on methodology is given in Appendix B2, Peneder (2001) and Crespo-Fontoura (2007).

Table A4

Intensity structure of manufacturing exports of goods (percentage)

Czech Republic	**1995**	**2000**	**2007**	**Belgium**	**1995**	**2000**	**2007**
Mainstream	29.9	30.7	29.5	Mainstream	18.9	17.6	16.4
Labour intensive	18.8	17.6	12.7	Labour intensive	11.6	11.7	8.8
Capital intensive	24.3	19.5	17.8	Capital intensive	28.5	27.9	33.4
Marketing driven	12.2	9.4	9.2	Marketing driven	13.5	12.3	11.1
Technology driven	14.1	22.4	30.5	Technology driven	26.9	29.1	29.6
Hungary	**1995**	**2000**	**2007**	**Germany**	**1995**	**2000**	**2007**
Mainstream	21.3	18.2	20.4	Mainstream	27.4	25.3	26.3
Labour intensive	19.1	11.0	8.2	Labour intensive	10.8	9.3	9.6
Capital intensive	22.0	12.5	13.3	Capital intensive	19.6	16.8	18.9
Marketing driven	21.3	9.3	7.0	Marketing driven	9.8	8.8	9.0
Technology driven	16.1	48.4	50.4	Technology driven	32.3	39.6	35.5
Poland	**1995**	**2000**	**2007**	**Sweden**	**1995**	**2000**	**2007**
Mainstream	18.7	21.7	25.5	Mainstream	21.0	20.6	23.2
Labour intensive	33.0	27.4	19.4	Labour intensive	10.1	10.2	10.0
Capital intensive	23.8	19.1	19.8	Capital intensive	28.7	25.1	27.6
Marketing driven	13.6	12.7	13.7	Marketing driven	4.7	5.1	6.0
Technology driven	9.2	18.2	20.4	Technology driven	32.3	38.8	31.1
Slovakia	**1995**	**2000**	**2007**	**Finland**	**1995**	**2000**	**2007**
Mainstream	24.6	22.0	20.3	Mainstream	22.0	19.9	23.1
Labour intensive	16.2	16.0	13.2	Labour intensive	14.9	11.5	11.8
Capital intensive	42.0	31.7	22.6	Capital intensive	40.0	34.0	35.7
Marketing driven	9.2	7.2	7.1	Marketing driven	4.5	3.6	3.3
Technology driven	8.0	23.0	36.7	Technology driven	18.7	31.1	25.6
Romania	**1995**	**2000**	**2007**	**Portugal**	**1995**	**2000**	**2007**
Mainstream	14.4	13.3	21.4	Mainstream	16.9	18.4	21.2
Labour intensive	33.0	38.2	29.7	Labour intensive	31.6	27.1	20.4
Capital intensive	38.5	29.5	30.5	Capital intensive	16.2	16.6	22.0
Marketing driven	10.5	11.3	9.1	Marketing driven	17.4	15.0	15.1
Technology driven	3.3	7.7	9.0	Technology driven	18.0	22.8	20.3
Austria	**1995**	**2000**	**2007**	**Spain**	**1995**	**2000**	**2007**
Mainstream	31.2	27.2	29.4	Mainstream	18.4	18.1	19.2
Labour intensive	16.0	14.0	14.6	Labour intensive	10.0	10.5	9.7
Capital intensive	20.3	18.7	18.9	Capital intensive	22.2	23.4	26.3
Marketing driven	11.6	11.1	12.3	Marketing driven	17.3	15.8	14.6
Technology driven	20.3	28.4	24.1	Technology driven	31.7	32.1	29.7
Slovenia	**1995**	**2000**	**2007**	**Ireland**	**1995**	**2000**	**2007**
Mainstream	27.6	30.1	29.4	Mainstream	9.2	5.4	5.7
Labour intensive	23.7	21.1	15.6	Labour intensive	4.3	2.5	5.4
Capital intensive	17.8	17.8	18.7	Capital intensive	13.4	22.3	24.2
Marketing driven	11.0	9.8	9.1	Marketing driven	26.4	11.6	12.9
Technology driven	19.9	21.2	27.3	Technology driven	46.7	58.2	51.8

Note: Source of data for 1999–2007 is Eurostat Easy Comext (exports of goods by CN-8 products in euro). Data source for 1995–1998 is Eurostat Comext Online for Austria, Belgium, Germany, Sweden, Finland and Portugal (exports of goods by CN-8 products in euro), respectively UN Comtrade for Central and Eastern European countries (exports of goods by HS-6). The earliest data for Slovakia and Poland in Easy Comext is from 2004, so data for 1999–2003 come from UN Comtrade. The time series of Belgium for 1995–1998 contains Luxemburg as well. Easy Comext data were converted to CPA-3 structure by the conversion file of Eurostat. UN Comtrade data were converted to CPA-3 structure by Evangelos Pongas (Eurostat). CPA-3 industries are categorised according to skill groups by Peneder (2001). There is no data available for the Czech Republic in 1997. In some years the sum of the intensity categories do not sum up to 100 per cent as there are non-specified industries. More detail on methodology can be found in Appendix B2, Peneder (2001) and Crespo–Fontoura (2007).

Table A5

Specialisation in Central and Eastern Europe by industries

Czech Republic	1995	2000	2007
Food products, beverages, tobacco	0.45	0.41	0.41
Textiles. textile products	1.49	1.19	0.77
Leather, leather products	1.38	0.59	0.45
Wood, wood products	2.31	1.82	1.11
Pulp, paper, paper products, publishing, printing	0.81	0.86	0.98
Coke, refined petroleum	0.91	0.48	0.22
Chemicals, chemical products, man-made fibres	0.79	0.51	0.33
Rubber, plastic products	1.05	1.40	1.25
Other non-metallic mineral products	2.30	2.35	1.36
Basic metals, fabricated metal products	1.85	1.46	1.05
Machinery and equipment, n.e.c.	1.08	1.10	1.14
Office machinery and computers	0.23	0.33	2.14
Electrical machinery and apparatus n.e.c.	1.54	2.17	1.72
Radio, television, communication equipment	0.65	0.54	1.62
Medical, precision and optical instruments, watches	0.63	0.54	0.55
Motor vehicles, trailers and semi-trailers	0.56	1.15	1.19
Other transport equipment	0.65	0.36	0.49

Hungary	1995	2000	2007
Food products, beverages, tobacco	1.39	0.63	0.50
Textiles. textile products	2.07	1.12	0.46
Leather, leather products	2.55	1.26	0.64
Wood, wood products	1.50	0.90	0.55
Pulp, paper, paper products, publishing, printing	0.39	0.33	0.32
Coke, refined petroleum	2.11	0.46	0.11
Chemicals, chemical products, man-made fibres	0.83	0.36	0.39
Rubber, plastic products	0.85	0.71	0.81
Other non-metallic mineral products	1.02	0.67	0.75
Basic metals, fabricated metal products	1.24	0.64	0.45
Machinery and equipment, n.e.c.	0.81	0.60	0.83
Office machinery and computers	0.15	2.03	1.46
Electrical machinery and apparatus n.e.c.	2.22	1.95	1.68
Radio, television, communication equipment	1.38	1.82	3.84
Medical, precision and optical instruments, watches	0.53	0.48	1.04
Motor vehicles, trailers and semi-trailers	0.27	1.37	1.38
Other transport equipment	0.08	0.13	0.20

Slovakia	1995	2000	2007
Food products, beverages, tobacco	0.40	0.35	0.40
Textiles. textile products	0.77	1.10	0.68
Leather, leather products	1.26	1.81	1.25
Wood, wood products	2.47	1.69	1.16
Pulp, paper, paper products, publishing, printing	1.37	1.19	0.89
Coke, refined petroleum	2.73	2.62	1.42
Chemicals, chemical products, man-made fibres	1.17	0.67	0.30
Rubber, plastic products	1.38	0.91	1.03
Other non-metallic mineral products	2.37	1.54	0.94

Romania	1995	2000	2007
Food products, beverages, tobacco	0.26	0.20	0.26
Textiles. textile products	4.56	5.82	4.14
Leather, leather products	6.45	8.16	5.96
Wood, wood products	1.37	2.84	1.96
Pulp, paper, paper products, publishing, printing	0.17	0.13	0.18
Coke, refined petroleum	1.96	1.33	0.97
Chemicals, chemical products, man-made fibres	0.66	0.32	0.28
Rubber, plastic products	0.21	0.28	0.93
Other non-metallic mineral products	1.45	0.96	0.61
Basic metals, fabricated metal products	1.58	1.32	1.07
Machinery and equipment, n.e.c.	0.43	0.44	0.84
Office machinery and computers	0.03	0.30	0.36
Electrical machinery and apparatus n.e.c.	0.84	1.00	2.55
Radio, television, communication equipment	0.03	0.68	0.35
Medical, precision and optical instruments, watches	0.10	0.15	0.30
Motor vehicles, trailers and semi-trailers	0.15	0.15	0.52
Other transport equipment	0.66	0.75	1.28

Poland	1995	2000	2007
Food products, beverages, tobacco	0.71	0.80	1.12
Textiles. textile products	2.51	1.91	0.88
Leather, leather products	1.32	1.00	0.46
Wood, wood products	3.75	3.27	2.19
Pulp, paper, paper products, publishing, printing	0.52	0.81	0.81
Coke, refined petroleum	1.38	0.88	0.71
Chemicals, chemical products, man-made fibres	0.60	0.52	0.39
Rubber, plastic products	0.56	1.01	1.31
Other non-metallic mineral products	1.43	1.28	1.35
Basic metals, fabricated metal products	1.84	1.59	1.13
Machinery and equipment, n.e.c.	0.49	0.61	0.74
Office machinery and computers	0.03	0.06	0.32
Electrical machinery and apparatus n.e.c.	0.98	1.48	1.35
Radio, television, communication equipment	0.45	0.55	1.53
Medical, precision and optical instruments, watches	0.20	0.23	0.31
Motor vehicles, trailers and semi-trailers	0.51	1.15	1.20
Other transport equipment	2.10	0.80	0.76

Slovakia	1995	2000	2007
Basic metals, fabricated metal products	2.29	1.74	1.20
Machinery and equipment, n.e.c.	0.77	0.87	0.73
Office machinery and computers	0.05	0.18	0.41
Electrical machinery and apparatus n.e.c.	0.90	1.31	1.26
Radio, television, communication equipment	0.30	0.32	4.07
Medical, precision and optical instruments, watches	0.34	0.19	0.25
Motor vehicles, trailers and semi-trailers	0.36	1.51	1.46
Other transport equipment	0.72	0.41	0.30

Note: Export specialisation means a revealed comparative advantage (Balassa, 1965). The numerator is the exports of goods of a given country c in a given industry s going to the EU as the rate of total exports of goods of the given country going to the EU, while the denominator is the EU exports of goods in a given s industry going to the EU as the rate of total EU exports of goods going to the EU. More detail on methodology is given in Box 2. Data sources are Eurostat Easy Comext, Eurostat Comext Online (exports of goods by CN) and UN Comtrade (exports of goods by HS) which are converted to CPA-3. Exports by CPA was used to calculate specialisation. More detail on the exact data source and conversion according to countries is in Appendix B2. The methodology source for specialisation is Baumann–di Mauro (2007).

Appendix B

1 EXPORTS OF GOODS TECHNOLOGY STRUCTURE[20]

Exports of goods technology structure (A hypothesis in Chapter 3) is based on Industrial Development Report (UN, 2009), which classifies the products (by SITC-3) into four categories relating to the technology level of the products: resource based, low-tech, medium-tech, high-tech (Table B1).

Table B1

Resource based, low-tech, medium-tech and high-tech products

Resource based	
SITC product	**Description**
01 (except 011)	Meat and meat preparations, except meat of bovine animals
023	Butter and other fats and oils derived from milk
024	Cheese and curd
035	Fish, dried/salted/smoked etc.
037	Fish, crustaceans, molluscs etc.
046	Meal, flour of wheat, flour of meslin
047	Other cereal meals and flours
048	Cereal preparations etc.
056	Vegetables, roots and tubers etc.
058	Fruit, preserved and fruit preparations
06	Sugars, sugar preparations, honey
073	Chocolate and other food preparations containing cocoa
098	Edible products and preparations n.e.s.
1 (except 121)	Beverages and tobacco, except tobacco unmanufactured and tobacco refuse
247	Wood in the rough or roughly squared
248	Wood, simply worked
25	Pulp and waste paper
264	Jute, other textile bast fibres etc.
265	Vegetable textile fibres, etc.
269	Worn clothing etc.
334	Petroleum oils, oils obtained from bituminous minerals (other than crude)
335	Residual petroleum products
4	Animal and vegetable oils, fats and waxes
51 (except 512, 513)	Organic chemicals, except alcohols, phenols and carboxylic acids
52 (except 524)	Inorganic chemicals, except other inorganic chemicals
53 (except 533)	Dyeing, tanning and colour materials, except pigments, paints etc.
551	Essential oils, perfumes etc.
592	Starches, inulin, wheat gluten
62	Rubber manufactures n.e.s.
63	Cork and wood manufactures (excluding furnitures)
641	Paper and paperboard
66 (except 665, 666)	Non-metallic mineral manufactures n.e.s., except glassware and pottery
68	Non-ferrous metals

Medium-tech	
SITC product	**Description**
266	Synthetic fibres suitable for spinning
267	Other man-made fibres suitable for spinning
512	Alcohols, phenols
513	Carboxylic acids
533	Pigments, paints
55 (except 551)	Essential oils, perfume materials, except essential oils, perfumes, etc.
56	Fertilizers
57	Plastics in primary forms
58	Plastics in non-primary forms
59 (except 592)	Chemical materials and products, n.e.s., except starches, inulin, wheat gluten
653	Fabrics, woven, of man-made textile materials
671	Pig-iron
672	Ignots and other primary forms
678	Wire of iron and steel
711	Steam or other vapour-generating boilers, etc.
713	Internal combustion piston engines
714	Engines and motors, non-electric
72	Machinery specialized for particular industries
73	Metalworking machinery
74	General industrial machinery and equipment, n.e.s.
762	Radio broadcast receivers
763	Sound recorders or reproducers, etc.
772	Electrical circuits
773	Equipment for distributing electricity
775	Household-type equipment
78	Road vehicles
79 (except 792)	Other transport equipment, except aircraft, spacecraft etc.
81	Prefabricated buildings
872	Instruments and appliances, n.e.s.
873	Meters and counters, n.e.s.
88 (except 881)	Photographic apparatus, equipment, except photographic apparatus and equipment, n.e.s.

Note: The methodology source is Industrial Development Report (UN, 2009). For more detail on SITC product denominations see: http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=14

[20] More detail on methodology is contained in Industrial Development Report (2009).

Table B1

Resource based, low-tech, medium-tech and high-tech products (cont'd)

Low-tech		High-tech	
SITC product	**Description**	**SITC product**	**Description**
61	Leather. leather manufactures	54	Medicinal and pharmaceutical products
642	Paper and paperboard, cut to size or shape	712	Steam turbines, etc.
65 (except 653)	Textile yarn, fabrics, made-up articles, except fabrics, woven, of man-made textile materials	716	Rotating electric plant, etc.
665	Glassware	718	Power generating machinery, etc.
666	Pottery	75	Office machines and automatic data-processing machines
67 (except 671, 672, 678)	Iron and steel, except pig-iron, ingots and other primary forms and wire of iron and steel	761	Television receivers
69	Manufactures of metals, n.e.s.	764	Telecommunications equipment, n.e.s.
82	Furniture and parts thereof, etc.	77 (except 772, 773, 775)	Electrical machinery, n.e.s., except electrical circuits, equipment for distributing electricity and household-type equipment
83	Travel goods, handbags, etc.	792	Aircraft, spacecraft, etc.
84	Articles of apparel and clothing accessoires	871	Optical instruments
85	Footwear	874	Measuring, checking, analysing and controlling instruments
89 (except 892, 896)	Miscellaneous manufactured articles n.e.s., except printed matter and works of art, antiques	881	Photographic apparatus and equipment, n.e.s.

Note: The methodology source is Industrial Development Report (UN, 2009). For more detail on SITC product denominations see: http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=14

Resource-based products mainly involve food and basic products (wood, paper), which do not require a complicated manufacturing process. Low-tech products contain, for example, textile products, and some leather and glassware products. Medium-tech level includes some machinery and electrical equipment, transport equipment and telecommunications (partly). High technology is needed for pharmaceuticals, telecommunications (partly), computers and office machinery, and some precision instruments.

1999–2007 data come from Eurostat Easy Comext (exports of goods by SITC in euro), for 1995–1998 from OECD Stat (exports of goods by SITC in US dollar). The earliest data for Romania and Slovakia in OECD Stat are 1997, while Slovenia is not included. Technology structure is not affected by the fact that data are on a dollar base for 1995–1998 and a euro base for 2000–2007.

Alternative technology structure methodologies[21]

The above UN methodology is one possible methodology that was followed in this paper. However, there are other methodologies for classifying products into technology categories.

Eurostat classifies high-tech products (Table B2) using SITC-5 by R+D expenditures. High-tech products are, for example, aircraft, office machines and computers, telecommunications equipment, pharmaceuticals and (partly) electrical and non-electrical machinery. However, there is no methodology relating to other technology categories.

The OECD distinguishes four categories of manufacturing exports by ISIC-2 products: low-tech, medium-low-tech, medium-high-tech, high-tech (Table B3). Low-tech consists of food, textile, wood and paper products. Medium-low-tech means rubber, plastic and metal products. Medium-high technology level refers to chemicals (except pharmaceuticals), electrical equipment and motor vehicles. High technology is needed for pharmaceuticals, telecommunications, office machines and computers.

[21] For more detail on methodology see: What is high tech trade (2005), OECD Science, Technology and Industry Scoreboard (2007).

Table B2

High-tech products according to Eurostat

Air craft	Office and computer machinery	Radio, television, telecommunications		Medicaments	Scientific equipment			Electrical machinery	Non electrical machinery		Chemicals, chemical products		Military products
71,408	75,113	76,381	76,492	54,131	77,408	87,211	87,455	77,862	71,489	73,591	52,222	53,122	89,108
71,441	75,131	76,383	77,220	54,132	77,411	87,407	87,456	77,863	71,499	73,595	52,223	57,433	89,111
71,449	75,132	76,408	77,261	54,133	77,412	87,408	87,461	77,864	71,871	73,733	52,229	59,108	89,112
71,481	75,134	76,411	77,318	54,139	77,413	87,412	87,463	77,865	71,877	73,735	52,269	59,110	89,113
71,491	75,208	76,413	77,625	54,151	77,421	87,413	87,465	77,867	71,878	73,142	52,508	59,120	89,114
79,208	75,210	76,415	77,627	54,152	77,422	87,414	87,469	77,868	72,847	73,144	52,511	59,130	89,121
79,211	75,220	76,417	77,631	54,153	77,423	87,431	87,471	77,871	73,111	73,151	52,513	59,141	89,122
79,215	75,230	76,419	77,632	54,159	77,429	87,435	87,473	77,878	73,112		52,515	59,149	89,123
79,220	75,260	76,421	77,633	54,161	87,108	87,437	87,475	77,879	73,113		52,517		89,124
79,230	75,270	76,422	77,635	54,162	87,111	87,439	87,477	77,884	73,114		52,519		89,129
79,240	75,997	76,423	77,637	54,163	87,115	87,441	87,478		73,131		52,591		89,131
79,250		76,424	77,639	54,164	87,119	87,442	87,479		73,135		52,595		89,139
79,291		76,425	77,641	54,211	87,131	87,443	87,490		73,153		53,108		89,191
79,293		76,426	77,643	54,212	87,139	87,444	88,111		73,161		53,111		89,193
87,411		76,431	77,645	54,213	87,141	87,445	881,21		73,163		53,112		89,195
		76,432	77,649	54,219	87,143	87,446	88,411		73,164		53,113		89,199
		76,481	77,681	54,221	87,145	87,449	88,419		73165		53,114		
		76,482	77,688	54,222	87,149	87,451	89,961		73,312		53,115		
		76,483	77,689	54,223	87,191	87,452	89,963		73,314		53,116		
		76,491	89,879	54,224	87,192	87,453	89,966		73,316		53,117		
				54,229	87,193	87,454	89,967				531,19		
					87,199						53,121		

Note: The methodology source is Eurostat.

Table B3

Technology structure according to the OECD

Low-tech

ISIC	Description
15-16	Food, beverage, tobacco
17-19	Textil and leather products
20-22	Wood, paper, printing, publishing
36-37	Other manufacturing f. e. recycling

Medium-high tech

ISIC	Description
24 (except 2423)	Chemical products, except medicaments
29	Machinery
31	Electrical machinery and equipment
34	Motor vehicles, trailers
352+359	Railway equipment

Medium-low tech

ISIC	Description
23	Coke, refined petroleum, nuclear fuel
25	Rubber and plastic products
26	Other non-metallic mineral products
27-28	Basic and fabricated metal products
351	Building and repairing ships

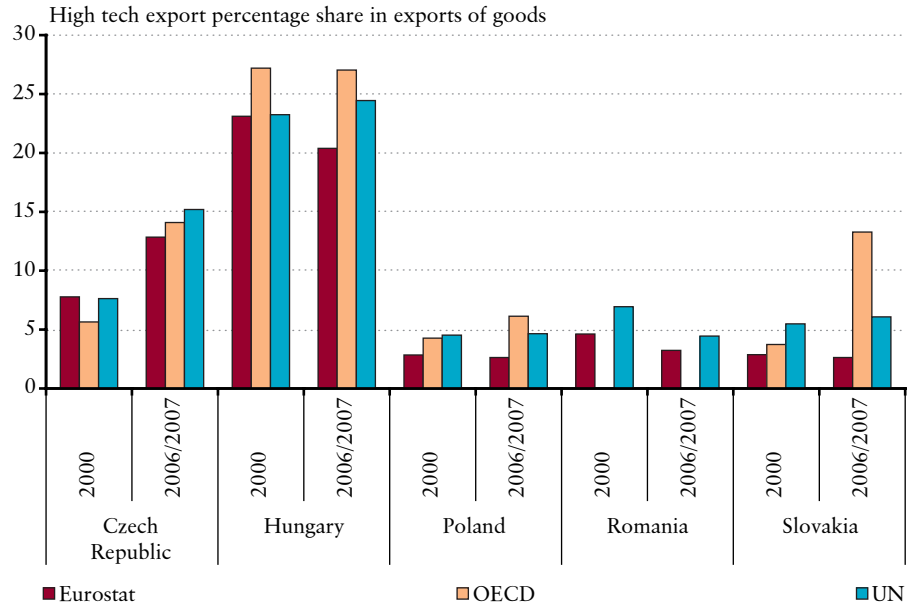
High-tech

ISIC	Description
2423	Medicaments
30	Office and computer machinery
32	Radio, television, telecommunications
33	Medical, optical instruments
353	Air and spacecraft

Note: The methodology source is the OECD.

Chart B1

High-tech export share by Eurostat, OECD and UN methodology (percentage)



Note: Eurostat and UN data are for 2007, but OECD data are from 2006. Eurostat data for 2000 come from the Eurostat database, but Eurostat data for 2007 is an own calculation following the Eurostat methodology as Eurostat has not yet published 2007 data (until finishing calculations of this study). UN data come from Eurostat Easy Comext. OECD data come from Quarterly Report on Inflation (May 2007), where no data for Romania were available.

To sum up, the different methodologies result in similar high-tech export shares (Chart B1). According to all methodologies, high-tech export share is the highest in Hungary, but the exact values differ. In the Czech Republic 15% of exports is high-tech. However, in Romania and Poland high technology is not relevant. For Slovakia high-tech export shares differ by methodologies; OECD methodology exceeds UN and Eurostat methodology.

2 OTHER EXPORT STRUCTURES[22]

Skill and intensity export structure methodology is based on Crespo–Fontoura (2007), which refers to Peneder (2001). NACE-3 industries are classified into four skill categories – low, medium (blue collar), medium (white collar) and high – and five intensity categories, namely, mainstream, labour intensive, capital intensive, market driven and technology driven, but due to missing data some industries were not classified (Tables B4-B5).

Low-skill industries usually employ workers who handle factory machines or are semi-skilled employees. In blue collar industries mainly skilled agricultural and fishing workers as well as craftsmen are employed. White collar skill means clerks, salesmen and people working in services. In high-skill industries mainly legislators, senior officials, managers and professionals are employed.

Labour intensive industries employ more people proportionately compared with the share in exports and value added of these industries, for example, textile and wood industries. Capital intensive industries use relatively less workforce to produce more value added, as in the iron and steel industry or crude oil processing, which use a lot of capital. Market driven industries spend large sums on advertising, for instance, food production, and industries involved with leisure and entertainment. Technology driven industries' R+D expenditures are very high, accounting for 40% of export-import turnover; examples include telecommunications, motor vehicles and chemicals. All other industries belong to mainstream and do not use more of any factor relative to another.

[22] More detail on methodology can be found in Crespo–Fontoura (2007) and Peneder (2001). NACE and CFA mean NACE before 2008 revision (NACE 1.1) in the whole paper

Table B4

Low, medium and high-skill industries

Low-skill

NACE	Description
151	Meat and meat products
152	Fish and fish products
153	Fruit and vegetables
154	Vegetable and animal oils and fats
155	Dairy products
156	Grain mill products, starches, starch products
157	Prepared animal feeds
158	Other food products
159	Beverages
160	Tobacco
171	Preparation and spinning of textile fibres
172	Textile weaving
173	Finishing of textiles
174	Made-up textile articles, except apparel
175	Other textiles
176	Knitted and crocheted fabrics
177	Knitted and crocheted articles
181	Leather clothes
182	Other wearing apparel and accessories
183	Dressing and dyeing of fur, manufacture of articles of fur
191	Tanning and dressing of leather
192	Luggage, handbags and the like, saddlery and harness
193	Footwear
201	Sawmilling and planing of wood, impregnation of wood
202	Manufacture of veneer sheets, plywood, etc.
203	Builders' carpentry and joinery
204	Wooden containers
205	Other products of wood
211	Pulp, paper and paperboard
212	Articles of paper and paperboard
221	Publishing
222	Printing
223	Reproduction of recorded media
231	Coke oven products
232	Refined petroleum products
233	Nuclear fuel
241	Basic chemicals
242	Pesticides, other agro-chemical products
243	Paints, varnishes, etc.
244	Pharmaceuticals, medicinal chemicals
245	Soap, detergents, etc.
246	Other chemical products
247	Man-made fibres
251	Rubber products
252	Plastic products
261	Glass and glass products
262	Non-refractory ceramic goods other than for contruction purposes
263	Ceramic tiles, flags
264	Bricks, tiles and construction products, in baked clay
265	Cement, lime, plaster
266	Articles of concrete, plaster and cement
267	Cutting, shaping and finishing of ornamental and building stone
268	Other non-metallic mineral products
271	Basic iron and steel and of ferro-alloys
272	Tubes
273	First processing of iron and steel
274	Basic precious and non-ferrous metals
275	Casting of metals

Medium-skill (blue collar)

NACE	Description
201	Sawmilling and planing of wood
202	Veneer sheets, plywood etc.
203	Builders'carpentry and joinery
204	Wooden containers
205	Other products of wood
281	Structural metal products
282	Tanks, reservoirs and containers of metal, etc.
283	Steam generators, etc.
284	Forging, pressing, stamping and roll forming of metal
285	Treatment and coating of metal
286	Cutlery, tools and general hardware
287	Other fabricated metal products
341	Motor vehicles
342	Bodies for motor vehicles, trailers, semi-trailers
343	Parts and accessories for motor vehicles and their engines
351	Building and repairing of ships and boats
352	Railway, tramway locomotives, rolling stock
354	Motorcycles, bicycles
355	Other transport equipment n.e.c.
361	Furniture
362	Jewellery
363	Musical instruments
364	Sports goods
365	Games and toys
366	Miscellaneous manufacturing n.e.c

Medium-skill (white collar)

NACE	Description
211	Pulp, paper, paperboard
212	Articles of paper and paperboard
221	Publishing
222	Printing
223	Reproduction of recorded media
232	Refined petroleum products
241	Basic chemicals
242	Pesticides and other agro-chemical products
243	Paints, varnishes, etc.
245	Soap, detergents, etc.
246	Other chemical products
247	Man-made fibres
297	Manufacture of domestic appliances n.e.c.
311	Electric motors, generators and transformers
312	Electricity distribution and control apparatus
313	Insulated wire and cable
314	Accumulators, primary cells, primary batteries
315	Lighting equipment and electric lamps
316	Manufacture of electrical equipment n.e.c.
321	Electronic valves and tubes
322	Television, radio transmitters, etc.
323	Television, radio receivers, etc.
331	Medical and surgical equipment
332	Instruments and appliances for measuring, checking, etc.
333	Industrial process control equipment
334	Optical instruments, photographic equipment
335	Watches and clocks

Note: Methodology based on Peneder (2001).

Table B4

Low, medium and high-skill industries (cont'd)

High-skill	
NACE	**Description**
244	Pharmaceuticals, medical chemicals
291	Machinery for mechanical power, except aircraft, vehicle and cycle engines
292	Other general purpose machinery
293	Agricultural and forestry machinery
294	Machine tools
295	Other special purpose machinery
296	Weapons and ammunition
300	Office machinery and computers
353	Aircraft and spacecraft

Note: Methodology based on Peneder (2001).

Table B5

Mainstream, labour intensive, capital intensive, market driven and technology driven industries

Market driven	
NACE	**Description**
151	Meat and meat products
152	Fish and fish products
153	Fruit and vegetables
154	Vegetable and animal oils and fats
155	Dairy products
156	Grain mill products, starches, starch products
157	Prepared animal feeds
158	Other food products
159	Beverages
160	Tobacco
191	Tanning and dressing of leather
192	Luggage, handbags and the like, saddlery and harness
193	Footwear
221	Publishing
222	Printing
223	Reproduction of recorded media
245	Soap, detergents etc.
282	Tanks, reservoirs and containers of metal, etc.
286	Cutlery, tools and general hardware
335	Watches and clocks
363	Musical instruments
364	Sports goods
365	Games and toys
366	Miscellaneous manufacturing n.e.c

Technology driven	
NACE	**Description**
242	Pesticides and other agro-chemical products
244	Pharmaceuticals, medicinal chemicals
246	Other chemical products
300	Office machinery and computers
312	Electricity distribution and control apparatus
321	Electronic valves and tubes
322	Television, radio transmitters etc.
323	Television, radio receivers etc.
331	Medical and surgical equipment
332	Instruments and appliances for measuring, checking etc.
333	Industrial process control equipment
334	Optical instruments, photographic equipment
341	Motor vehicles
353	Aircraft and spacecraft

Capital intensive	
NACE	**Description**
171	Preparation and spinning of textile fibres
211	Pulp, paper and paperboard
232	Refined petroleum products
241	Basic chemicals
247	Man-made fibres
263	Ceramic tiles, flags
265	Cement, lime, plaster
271	Basic iron and steel and of ferro-alloys
273	First processing of iron and steel
274	Basic precious and non-ferrous metals
343	Parts and accessories for motor vehicles and their engines

Note: The methodology is based on Peneder (2001).

Table B5

Mainstream, labour intensive, capital intensive, market driven and technology driven industries (cont'd)

Mainstream		Labour intensive	
NACE	Description	NACE	Description
173	Finishing of textiles	172	Textile weaving
175	Other textiles	174	Made-up textile articles, except apparel
176	Knitted and crocheted fabrics	181	Leather clothes
177	Knitted and crocheted articles	182	Other wearing apparel and accessories
212	Articles of paper and paperboard	183	Dressing and dyeing of fur, manufacture of articles of fur
243	Paints, varnishes etc.	201	Sawmilling and planing of wood, impregnation of wood
251	Rubber products	202	Manufacture of veneer sheets, plywood etc.
252	Plastic products	203	Builders' carpentry and joinery
261	Glass and glass products	204	Wooden containers
266	Articles of concrete, plaster and cement	205	Other products of wood
268	Other non-metallic mineral products	262	Non-refractory ceramic goods other than for contruction purposes
272	Tubes	264	Bricks, tiles and construction products, in baked clay
287	Other fabricated metal products	267	Cutting, shaping and finishing of ornamental and building stone
291	Machinery for mechanical power, except aircraft, vehicle and cycle engines	275	Casting of metals
292	Agricultural and forestry machinery	281	Structural metal products
293	Mezőgazdasági gép gyártása	283	Steam generators, etc.
295	Other special purpose machinery	284	Forging, pressing, stamping and roll forming of metal
296	Weapons and ammunition	285	Treatment and coating of metal
297	Manufacture of domestic appliances n.e.c.	294	Machine tools
311	Electric motors, generators and transformers	316	Manufacture of electrical equipment n.e.c.
313	Insulated wire and cable	342	Bodies for motor vehicles, trailers, semi-trailers
314	Accumulators, primary cells, primary batteries	351	Building and repairing of ships and boats
315	Lighting equipment and electric lamps	352	Railway, tramway locomotives, rolling stock
354	Motorcycles, bicycles	361	Furniture
355	Other transport equipment n.e.c.	362	Jewellery

Note: The methodology is based on Peneder (2001).

CN/HS–CPA conversion

To calculate skill and intensity exports of goods structure and specialisation, exports according to CPA were used, which were converted from the product structure.

Export data by product groups come from different sources. For 1999–2007 data of analysed countries (except Slovakia and Poland) come from Eurostat Easy Comext (exports of goods according to CN-8 in euro). The data source for 1995–1998 regarding Austria, Belgium, Germany, Sweden, Finland, Portugal, Spain and Ireland is Eurostat Comext Online (exports of goods according to CN-8 in euro). Data for Hungary, Romania and Slovenia for 1995–1998 originate from UN Comtrade (exports of goods according to HS-6)[23]. Regarding Slovakia and Poland, data for 2004–2007 come from Easy Comext (exports of goods according to CN-8 in euro). Slovak and Polish 1999–2004 country level data are secret, consequently, 1995–2003 data come from UN Comtrade (exports of goods according to HS-6).

[23] Data by HS are in euro which are converted from dollar to euro by average US dollar-euro exchange rate of the given period.

To calculate specialisation, EU exports going to the EU and EU imports coming from the EU according to CPA are also needed [thank Evangelos Pongas (Eurostat) for compiling]. For 1999–2007 the source of exports of goods and imports of goods is Eurostat Easy Comext (according to CN-8 in euro). For 1995–1998 the EU time series are an aggregate of the country time series. For countries and years, a CN-8 structure is used when available, but in other cases the HS-6 structure is used. Although for Slovakia and Poland 1999–2004 country level data are secret, they could be considered for calculating aggregate EU time series. Bulgaria's exports of goods and imports of goods data are not available for 1995; they were imputed by 1996 data. The Czech Republic's data are not available for 1997, consequently, the average of 1996 and 1998 was used.

Conversion was made in the following way. CN data were converted by Eurostat CN-CPA conversion file to CPA-3. (CPA and NACE means the same until 4 digit level.[24]) HS-6–CPA-3 conversion is based on professional judgement by Evangelos Pongast (Eurostat). It is important to highlight that the HS-CPA conversion is very uncertain.

3 METHODOLOGY OF VALUE ADDED[25]

Between 1995 and 2005 EU Klems was used, which contains value added data for the total economy, manufacturing and some industries as well (in volume, 1995=100). EU Klems does not include Romania.

In national accounts Eurostat publishes real value added data for most Central and Eastern European countries, which, however, are less detailed and for some countries only from 1999.[26] Consequently, EU Klems data were lengthened to 2006–2007 in line with Eurostat data, assuming a similar dynamics for these years (which assumption is based on the fact that there is a similar dynamics in those years where both data sets publish data). Thus 2006 and 2007 are estimates.

4 PRICE INDICES AND UNIT VALUE INDICES

There are several statistics to illustrate price changes: exports of goods and imports of goods price indices based on representative surveys, exports of goods and imports of goods unit value indices in foreign trade statistics; implicit export and import price indices in national accounts; and industrial non-domestic price indices in industry statistics (Table B6). Price indices and unit value indices from foreign trade statistics refer only to exports of goods and imports of goods. Implicit export and import price indices are a quotient of value and volume exports and imports, and are available for both goods and services. Price indices from industry statistics refer not only to goods turnover, but also to total industrial production. However, for non-euro area countries they are available only for exports.

Table B6

Statistics illustrating price changes

	Representative price index	Unit value index	Implicit price index	Industrial non domestic producer price index
Data source	Foreign trade statistics	Foreign trade statistics	National accounts	National accounts
Turnover type	Only goods	Only goods	Goods and services	Industrial production
Turnover direction	Export and import	Export and import	Export and import	Only export
Composition effect	No	Yes	Can	No

Note: information comes from the Hungarian Statistical Office and Eurostat.

[24] More detail on NACE and CPA can be found in NACE Rev. 2 Introductory Guidelines.

[25] More derail on EU Klems is in Ark et al. (2005).

[26] The industry structure of real value added published by Eurostat is available in the following cases: Czech Republic for 1995–2007, Hungary for 1999–2007, Slovakia for 1995–2006 and Romania for 1999–2006. There is no data available for Poland by industries.

Table B7

Foreign trade price indices published by different statistical offices

	Germany
Period	The German Statistical Office publishes foreign trade import of goods price index since 1950, export of goods price index since 1954.
Frequency and product structure	Monthly data (since 1962, according to SITC-1 and SITC2).
Product basket	Now the basket is from 2000, which was introduced in 2004. At that time price indices between 2000-2004 were recalculated with the new weights. In March 2009 the new 2005 basket was introduced.
Country structure	Euro area and non-euro area price indices.
Currency	Euro base.
	Hungary
Period	The Hungarian Central Statistical Office publishes foreign trade export of goods and import of goods price indices since 2003.
Frequency and product structure	Monthly data for the main 5 product groups and SITC-1. Quaterly and yearly data for SITC-1 and SITC-2.
Product basket	No fixed basket, but the geometric average of the previous year basket (Lasypreys index) and the current month basket (Paasche index) (Fisher index).
Country structure	Country groups changed several times in recent years when new states entered EU.
Currency	HUF base.
	Czech Republic
Period	The Czech Statistical Office publishes foreign trade export of goods and import of goods price index since 1993.
Frequency and product structure	Monthly data (SITC-1).
Product basket	In 2006 the 2005 basket was introduced, this time the data from 2005 and 2006 were recalculated, but previous years' data are based on the 1999 basket.
Country structure	No data by country groups.
Currency	Based on Czech Koruna.

Note: Information comes from the national Hungarian, Czech and German statistical offices.

The main difference between price indices based on representative surveys and unit value indices is the composition effect. Price indices based on representative surveys show only price changes; the composition effect is a part of the volume index. However, unit value indices contain the composition effect as well, and in this case the volume index does not contain. From an economic perspective price indices are preferred, as they show only the effect of price changes.

Not all countries publish price indices based on representative surveys. The more detailed the product structure, the less composition effect a unit value index contains and the less bias it shows regarding the effect of price changes. At the individual product level both show price changes only.

In Central and Eastern Europe the national Czech and Hungarian statistical offices publish price indices based on representative surveys in their foreign trade statistics (Table B7). The Statistical Office of the Slovak Republic began to publish these kinds of statistics in 2009. Other statistical offices publish unit value indices.

Implicit price indices in national accounts are based on price indices or unit value indices derived from foreign trade statistics. Consequently, implicit price indices may contain the composition effect when a country calculates unit value indices only. However, implicit price indices probably approximate price changes better than unit value indices.

In industry statistics non-domestic price indices are published for countries in the region (Table B8). There are methodology differences between the exports of goods price index from foreign trade statistics and the non-domestic price index from industry statistics. However, a great majority (more than 90%) of exports of goods are related to manufacturing, consequently, the two statistics show similar processes. Manufacturing non-domestic price indices are based on representative observation, consequently, they do not contain the composition effect. The foreign trade exports of goods price index is available according to SITC products, but non-domestic price indices are categorised by NACE industries. Non-domestic production prices are only available for exports in the case of non-euro area countries.

Table B8

Industrial production price indices published by different statistical offices

	Hungary
Frequency	Monthly
Sectors	C, D and E sections, divisions in these sections and some important groups and classes
Period	since 1998
Note	Price indices are computed without VAT, registration tax, energy tax and excise duties. However cut-offs and subsidiaries are included. Transport costs are not included. Attempts are being made to tkae quality changes into consideration.
Sample	Sample of goods and companies is renewed every year.
Type of price index	Laspeyres index, weights are coming from turnover two years ago, weights are renewed every year.
Sesonal adjustment	No seasonal adjustment.
	Czech Republic
Frequency	Monthly
Sectors	C, D and E sections, divisions and groups in these sections
Period	n. a.
Note	-
Sample	Products are freshened regularly, a new sample is computed every five years.
Type of price index	Laspeyres index, weights coming from year 2005 (from residents' sales).
Sesonal adjustment	n.a.
	Slovakia
Frequency	Monthly
Sectors	C, D and E sections, divisions and groups in these sections, except some less important groups
Period	since 1993
Note	VAT and excise duties are not considered. Non-domestic producer prices do not contain transport costs.
Sample	Sample is changed every five years, the latest is from 2000.
Type of price index	Alterd Laspeyres index, weights from year 2000 (from turnover data).
Sesonal adjustment	No seasonal adjustment.
	Poland
Frequency	Monthly
Sectors	C, D and E sections
Period	since 1990
Note	VAT and excise duties, cut-offs not cosidered, but subsidies are included.
Sample	Sample of goods and companies is renewed every year (at the beginning of the year).
Type of price index	Paasche index. Weights coming from the current month and year 2000.
Sesonal adjustment	No seasonal adjustment.
	Romania
Frequency	Monthly
Sectors	C, D and E sections
Period	since 1993
Note	No VAT included.
Sample	Sample renewed every year.
Type of price index	Laspeyres index.
Sesonal adjustment	n. a.

Note: Based on Eurostat Circa. Sectors in the table mean NACE 1.1.

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CN: Combined Nomenclature – European Classification of Goods
http://ec.europa.eu/taxation_customs/customs/customs_duties/tariff_aspects/combined_nomenclature/index_en.htm

CPA: European Classification of Products by Activity

NACE: Nomenclature générale des activités économiques dans les Communautés Européennes, European Classification of Economic Activities
http://ec.europa.eu/competition/mergers/cases/index/nace_all.html

SITC: Standard International Trade Classification of the United Nations
http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=14

Datasets

MECO: http://ec.europa.eu/economy_finance/db_indicators/db_indicators8646_en.htm

Comext Online: http://comext.eurostat.ec.europa.eu/comm/eurostat/comext/appfull_en_http_Server8.htm

Easy Comext: http://epp.eurostat.ec.europa.eu/portal/page/portal/external_trade/data/database

EU Klems: http://www.euklems.net/

Hungarian Statistical Office: http://www.ksh.hu

OECD Stat: http://lysander.sourceoecd.org/vl=4153879/cl=28/nw=1/rpsv/home.htm

RAMON (Eurostat): http://ec.europa.eu/eurostat/ramon/index.cfm?TargetUrl=DSP_PUB_WELC

UN Comtrade: http://comtrade.un.org/

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